POPULAR Computing WEEKLY

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BRITAIN'S BEST-SELLING MICRO WEEKLY

CLASSIFIEDS START HERE



News Desk

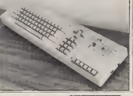
Summer delivery for Amstrad

THE new Amstrad games computer will be formally announced next week

The machine with 64K Ram 32K Rom, a Z80 microprocessor and a built in cassette unit will be offered in two forms A version including a separate black and white monitor will sell for £199 For £299 the price will include a monitor quality colour display (see *Popular Computing Weekly* March 15)

The machine features three text display modes — 20 40 and 80 columns — and three graphics modes 160 x 200 pixels 320 x 200 pixels and 640 x 200 pixels The colour resolution in the highest resolution mode is four colours per horizontal pixel screen line

First deliveries of the machine to shops are expected in the summer



Home copying beaten by dongle?

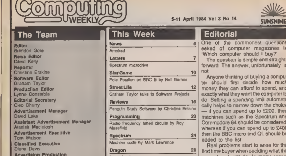
MICRODEAL has developed a software key or 'dongle' which it hopes will put an end to home copying of its cassette software

The small hardware unit — about 1 inch square and ½ inch deep — plugs into the joystick port of the Dragon while a specially encrypted program is loaded If the program is loaded without the software key connected to the joystick port then the program will not run Once the specially prepared program has been loaded with the key in place it can be removed the joystick connected, and the game played in the usual manner

The idea is to give away the software key with each copy of the program sold While the program can still be copied the copies cannot be made to load without the key Up to 2,000 different combinations are possible with the key although all tapes of any particular program would be pro-

continued on page 5 ▸

This Week



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The Team

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How to submit articles
Articles which are submitted for publication should not be more than 3 000 words long The articles and any accompanying programs should be original It is breaking the law of copyright to copy programs out of other magazines and submit them here — so please do not be tempted

Accuracy
Popular Computing Weekly cannot accept any responsibility for any errors in programs we publish although we will always try our best to make sure programs work

This Week

Editorial

One of the commonest questions asked of computer magazines is 'Which computer should I buy?'

The question is simple and straightforward The answer, unfortunately is not

Anyone thinking of buying a computer should first decide how much money they can afford to spend, and exactly what they want the computer to do Setting a spending limit automatically helps to narrow down the choice — if you can spend up to £200, then machines such as the Spectrum and Commodore 64 should be considered, whereas if you can spend up to £400 then the BBC micro and QL should be added to the list

Real problems start to arise for the first time buyer when deciding what the computer should do In many cases the purpose behind buying a computer is to find out what it can do The first time buyer is seeking to enter a new field not to engage in specific word processing or other micro related tasks

The experienced user, with a particular function in mind, has no such problems He just finds the machine which best matches his needs

If you are a first time buyer and don't know what you want a computer to do the only solution is to take the plunge and buy one of the cheaper micros available You can always upgrade later if you discover that you want to use your micro for more sophisticated tasks

Next Thursday

Next week's star game is Pacman — which needs no explanation! — for Commodore 64 by S Guys

Sinclair misses second deadline

SINCLAIR has failed to keep to its own revised delivery schedule for the first of its new QL microcomputers

Following initial production delays in February, Sinclair announced that although it would be unable to keep to the 28-day dead-line for mail-order deliveries, it expected to despatch the first production run of machines — around 1,000 units — by the end of March

With that deadline now passed Sinclair's design difficulties are still continuing and Sinclair at present still has no more than a handful of pre production machines Sinclair's managing director Nigel Clarke himself suggested one shipment deadline for the end of March A spokesman for Sinclair admitted, "It is true that no QLs have yet been despatched but we are confident of sticking to the target dates in the letters we sent to customers " First of these is the end of April

Sinclair has announced that it has appointed Prism as retail distributor of the machine It is also working on an implementation of the Prolog language for the machine

● *PCW's* QL order Week 11 Interest gained by Sinclair from our order is now over £5 The nature of the compensation to be offered by Sinclair is still shrouded in mystery

Microdeal dongle

continued from page 1

tected with the same code

Microdeal shortly plans to launch its first title protected by the dongle — *Buzzard Bait* for the Dragon 32 The program will cost more than other Microdeal games — £9 95 — because of the additional cost of manufacturing and including the protection device

According to Microdeal managing director John Symes the game was picked because it was the "best Dragon program we could find" *Buzzard Bait* is written by the US Tandy software house Tom Mix — which also produced *The King*

The title will be released in the UK under the Tom Mix banner, through a new company — Tom Mix Software formed jointly by John Symes and Tom Mix

"The development of the software key was undertaken for us by Northern Software Consultants and we are in the process of patenting our device

"The key is encased in epoxy resin — even if people do discover what the custom chip inside does, it will take them six or seven off-the-shelf chips to emulate its behaviour the cost of which are more than the cost of the original game

"Our protection device is an experiment If we don't sell more of *Buzzard Bait* than we usually do for a Dragon game then we will know it has been a failure

"If it does sell well then we will produce versions of the key to protect Commodore 64 and Atari material

Robotics resignation

JOHN Reekie has resigned as managing director of Colne Robotics to set up a new company, Reekie Research The purpose of the new company is to develop a hobby robot

The home robot will be of modular construction and the base unit — wheels motor and basic platform — will sell for around £150 A rack system is then used to add up to 10 additional circuit boards to give the device a variety of extra features — an arm infrared control ultrasonic detection, voice synthesis and voice recognition

The complete unit with on board system software and the capability to be controlled from a base micro using the infra red communication link will be priced around £700

The robot will be designed so that it will operate from any micro with either an RS232 or Centronics interface

The Reekie Research robot is scheduled to be launched in the autumn

Wrath of Magra delay

CARNELL Software's long awaited graphic adventure *The Wrath of Magra* has been delayed still further.

The three part program is now not expected to be released until mid-April, some seven months later than originally expected

Micro shows round-up

BOTH the Sinclair Education Exhibition and the Electron and BBC Micro User Show were held last week

The 29 exhibitors at the Sinclair show in Westminster Central Hall had to compete for attention with Sinclair Research's own stand where its version of the Logo programming language was being launched, and where on the first day of the show, a QL machine was on display By the second day however, the QL had mysteriously disappeared

At the New Horticultural Hall 500 yards up the road, there were over 70 stands at the Electron BBC show Among the companies, Pace Disk Systems launched *Fortress*, a *Zaxxon* style game at £8 95, and Allgata Software introduced *Spitfire Simulator*, following in the footsteps of Acornsoft's *Aviator* Judging from the show, Electrons are still fairly thin on the ground

Magic voice is launched

COMMODORE'S Magic Voice module has been launched at last

The module fits into the Commodore 64 cartridge port, and is being launched in conjunction with two new series of software programs, which have been written to make use of it — *Talking Book* and *BJ the Bear*

BJ the Bear features in the *Get Ready* suite of educational programs, designed for three to five year olds

Get *Ready to Read* is now available — at £11 99 on cassette or disc — and *Get Ready to Think* and *Get Ready for Numbers* should be out in mid-April

There are four learning levels on each program, and a menu of eight activities to each stage The activities consist of question and answer games

If the child gets the answer right, BJ's smiling head appears and confirms the correct answer If not, his expression is distinctly grumpy

A number of different phrases are generated by the software using the Magic Voice module, to express approval or disapproval such as "Yes", "That is not correct", and "You are right"

Each *Get Ready* package also contains a teacher's/parent's manual, and a story book about BJ for the child

Magic Voice has a vocabulary of 187 words the data for each letter of the alphabet and numbers Commodore are planning to bring out a diskette with extra vocabulary in the near future

The joystick that never was

THIS rather strange looking object is a revolutionary type of joystick developed by Sinclair

Yet it will now never go into production Market research conducted by the company has shown that people prefer the more traditional type of device with a hand grip

The prototype, developed by Sinclair's research and development team is a cross between a conventional joystick and a cursor control 'mouse' The hard plastic pad rests on a springy cushion To operate it the rim is depressed — pushing down on the left-hand edge will send a 'left' instruction to the Spectrum and so on


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Letters

Sinclair's 'magic list'

Good news for all Spectrum owners who didn't buy their machines by mail-order from Sinclair.

Anybody can receive information on new Sinclair products or changes of availability by being added to Sinclair's 'magic list'. All they need to do is send their name and address on a postcard to Sinclair Research, Department M, Freepost, Camberley, Surrey GU15 3BR.

For example I recently received from Sinclair the following communication 'Please be advised that the previous restrictions imposed on microdrive units and/or Interface 1 products have now been lifted. Therefore you can now order by letter or telephone any further items in this range.'

Stephen Greiff
1 Chalfont Grove
Hastings Hill
Sunderland
Tyne and Wear

Is QL necessary?

One of your correspondents wrote recently asking for comments from users of the ZX Microdrive. I have just received my twin Microdrives and I have to confess that I am extremely impressed with their performance.

From the moment I switched them on they have functioned without error and every verification has proved successful.

Like many Spectrum owners not only am I the proud owner of a Spectrum and Microdrives, I am also on the waiting list for the QL. I had planned on selling the Spectrum when the QL arrived but I am now seriously considering cancelling my QL order.

Why? In terms of hardware, there appears to be very little that the QL can do that the Spectrum can't. The QL of course has 128K of Ram but with Microdrives available, is this really necessary? The big disadvantage of the QL is the lack of cassette interface.

One of the selling points of the QL is the software packages provided with the machine. However, the Spectrum has a fairly impressive list to draw on. Campbell's *Masterfile* is an excellent database and file-handling system. *Tasword* is an excellent wordprocessor. Spread sheet programs for the Spectrum abound but none of them come up to the promise of the QL package. However, Microsphere are promising up to 85 characters a line. This is already available on the Spectrum through Myrmidon Software's *Microprint 85*. This is an excellent piece of code which gives the programmer virtually a free hand in terms of character width.

Long live the Spectrum. Will the QL *ever* leave the maternity unit?

John Crook
'Pencoed'
Sheets Heath Lane
Brookwood
Woking
Surrey

Pot calling kettle black

It is now about six weeks since I sent off my coupons and cheque for your *Eye of the Star Warrior* tape offer.

Despite your 'allow 28 days for delivery' clause — just like the Sinclair ads — I have so far received nothing.

Yet you still, weakly, publish details of the delay of your Sinclair QL. Isn't this the pot calling the kettle black, when you seem unable to meet mail-order delivery schedules yourselves?

Could I have some action please.

R A P Rudd
56 Cairngorm Crescent
Kincorth
Aberdeen

The bulk of the *Eye of the Star Warrior* tapes were dispatched within 28 days of receipt of order. However, a few people appear not to have received their tapes. If anyone has experienced any delays, please let us know.

No heroes

I am a 30-year old European from West Germany and my home is only 20km from the Möhnesee dam. I think your magazine is one of the best in Europe.

In the February 9 issue you published a review of a program *Dambusters* under the heading 'Heroic Stuff'. At last it is possible to bomb the Möhnesee every day — to kill hundreds of thousands of civilians. Is that a heroic act?

I am waiting for your answer.

Bodo Kirtz
Birmeckerweg 30
5778 Meschede Wehrstapel
West Germany

Our review was intended as a satire — making very much the same observation as yourself.

Late arrivals

I would like you to publish this letter so that your readers know what kind of after-sales service they might get from Sinclair Research Ltd.

It started with the ZX80, which arrived six weeks later than it should have done. Then I bought a ZX81. And then a Spectrum 16K for which I had to wait a total of 20 weeks.

After 11 months of satisfied custom the Spectrum went faulty on July 25th 1983. It took until the middle of January before I finally got a working Spectrum again after numerous letters and telephone calls to Sinclair. If that was not bad enough I have just recently put a claim in for P&P and they told me that it only costs £3.10 to send a Spectrum — yet they have the cheek to charge the customer £4.95.

The only consolation I got from Sinclair Research was that I could have any software cassette which costs less than £10 – which is nowhere near the cost of my telephone bills and the cost of postage. The average call to Sinclair Research is 15-20 minutes long and at 25p per minute that is £4.75-£5 every time I ring.

If this is the service they give to a regular customer then what kind of service are they going to give to a new customer?

Richard Bourne
10 Longfield View
Normanby
Middlesbrough
Cleveland

PS I have also lost count of the number of times they have promised me a delivery date and failed to meet it.
PPS Sir Clive is my hero.

Women and computers

I feel most strongly on the subject of women & computers, as I have been using computers for four years now ever since the dark age of my Video Genie. I have since updated to a BBC and a Spectrum, which are constantly used until the early hours.

How it is reported that very few women use computers I'll never know, as one look at Micronet tells a completely different story. It is constantly used by many women and girls of all ages.

It would be a far better idea for Micronet or Prestel to organise their own voting poll to get a true idea. So what about it?

Vicki Blundell
4 Ladbrooke Close
Potters Bar
Hertfordshire EN6 1PQ

VALH

GAME OF THE YEAR

"BRITISH
MICROCOMPUTING
AWARDS 1984"


ALLA



Star Game

Pole Position

A new game for BBC Model B by Neil Barnes

Pole position is a graphical car racing game for the 32K BBC Model B with 1.2 OS, written in Mode 1. The object of the game is to travel for 200 miles without crashing into either the course or the skulls (which are randomly littered over the course). If you can collect any oil, then one mile is added to your score.

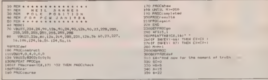
Procedures

PROC def	—	gives instructions for the user
PROC instruct	—	gives instructions for the user
PROC go	—	checks for key depressions and increases the mileage
PROC check	—	decides if a skull has been hit or an oil can has been detected and calls various other procedures
PROC car	—	prints the car on the screen
PROC course	—	prints the course and the various objects
PROC show	—	prints at the top of the screen the current score and mileage covered
PROC completed	—	called if 200 miles has been covered produces a fanfare and gives a rating according to how many oil cans have been collected
PROC results	—	called if you crash before 200 miles — high scorer?
PROC again	—	Another go?
PROC die	—	sounds a death siren
FN screen	—	rather complicated code — checks for collisions

Variables used Function

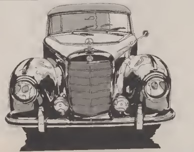
CX	Horizontal position of car
M	Miles covered
SC	Number of oil cans collected
HS	Highest score
A,B	Decide the printing position of the various obstacles
A%	Used in conjunction with FN screen
C	Used in conjunction with FN screen
ST	Prints stars in PROC results
S T Q W	Random number generators
DEL,G,J N,P,U V	General loop variables
E$	End of game message
HH$	High scorer
A$	Another go?

When entering the listing, all the spaces must be included — these are vital to the efficiency of the game.



```
10 REM * * * * * * * * * * * * * * * *
20 REM     N E I L   B A R N E S
30 REM   P O L E   P O S I T I O N
40 REM  F O R  P C W  J A N 1 9 8 4
50 REM * * * * * * * * * * * * * * * *
60 MODE1
70 VDU23,224,24,90,126,90,24,90,126,90,23,228,255,
   255,255,255,255,255,255,255
80  VDU23,226,60,126,219,255,231,126,36 60,23,227,
   16,106,124,16,56 124,56,16

90PROCdef
100 PROCinstruct
110VDU19,0,4,0,0,0
120 VDU23;8202;0;0;0;
130REPEAT PROCgo
140IF FNscreen(CX,17) <>32 THEN PROCcheck
150PROCcar
160 PROCcourse
170 PROCshow
180 UNTIL M>=200
190 PROCcompleted
200PROCresults
210PROCagain
220 END
230DEFPROCgo
240 *FX15,1
250PRINTTAB(CX,16)" "
260IF INKEY(-66) THEN CX=CX-1
270IF INKEY(-67) THEN CX=CX+1
280 M=M+1
290ENDPROC
300DEFPROCdef
310 E$="And now for the moment of truth
320 SC=0
330 HS=5
340 A=15
350 B=22
```



```
360CX=20
370M=0
380AX=135
390ENVELOPE1,6,2,20,16,18,0,0,126,0,0,-126,126,126
400 ENVELOPE2,1,70,16,8,31,0,0,126,0,0,-126,126,126
410 ENVELOPE3,6,120,0,0,200,0,0,120,0,0,-126,126,126
420ENDPROC
430DEFPROCshow
440COLOUR2
450 PRINTTAB(0,0);"Distance:";M" miles"
460 COLOUR3
470 PRINTTAB(21,0);"Score:";SC" OIL CANS"
480 COLOUR3
490ENDPROC
500DEFFNscreen(a,b)
510VDU31,CX,17
520C=USR(&FFF4)
530C=C AND &FFFF
540C=C DIV&100
550=C
560ENDPROC
570DEFPROCcourse
580COLOUR 1
590PRINTTAB(8,31);CHR$225;TAB(22,31);CHR$225
600COLOUR3
610W=RND(1)
620Q=RND(1)
630 S=RND(13)
640 T=RND(13)
650 IF W< 7 THEN COLOURRND(4):PRINTTAB(W-S,22)CHR$226
660 IF Q< 3 THEN COLOURRND(4):PRINTTAB(Q-T,22)CHR$227
670ENDPROC
680DEFPROCcar
690PRINTTAB(CX,17)CHR$224
700ENDPROC
710DEFPROCdie
720 VDU23;8202;0;0;0;
730SOUND0,1,14,20
740COLOUR1:PRINTTAB(12 3)"POLE POSITION"
750 CLG
760ENDPROC
770DEFPROCcheck
780IF C=129 OR C=130 THEN PROCdie:PROCresults:PROCagain
790 IF C=131 THEN PROCbonus
800ENDPROC
810 DEFPROCbonus
820 SC=SC+1
830 SOUND2,2,3,8
840 ENDPROC
850DEFPROCresults
860 VDU19,0,5,0,0,0
870COLOUR2
880FOR ST=12 TO 28
890PRINTTAB(ST,2)"*"
900 PRINTTAB(ST,6)"*"
910NEXT
920 COLOUR1
930 PRINTTAB(14,4)"POLE POSITION
940 FOR J=3 TO 5
950 COLOUR3
960 PRINTTAB(12,J)CHR$224
970  PRINTTAB(28,J)CHR$224
980  PRINTTAB(5,4)"NEIL"
990   PRINTTAB(31,4)"BARNES"
1000 NEXT J
1010 SOUND1,3,100,60
1020 FOR V=1 TO 8
1030 FOR DEL=1 TO 20
1040 PRINTTAB(V,15)CHR$224
1050 PRINTTAB(V,15)" "
1060 NEXT
1070 NEXT
1080 PRINTTAB(8,15)CHR$224
1090 FOR N=39 TO 31 STEP-1
1100 FOR DEL=1 TO 20
1110 PRINTTAB(N,15)CHR$224
1120 PRINTTAB(N,15)" "
1130 NEXT
1140 NEXT
1150 PRINTTAB(31,15)CHR$224
1160 FOR P=1 TO LEN(E$)
1170 F$=LEFT$(E$,P)
1180 TIME=0:REPEAT UNTIL TIME>8
1190 PRINTTAB(3,9)F$
1200 NEXT
1210 Z=INKEY(100)
1220 COLOUR2:PRINTTAB(12,15)"THE RESULTS";:COLOUR1:
     PRINT" ! ! !"
1230 J=INKEY(100)
1240 COLOUR3:PRINTTAB(2,20)"You managed to cover":
     COLOUR1:PRINTTAB(23,20);M:COL
1250 PRINTTAB(2,23)"While collecting":COLOUR1:PRINTTAB
     (24,23);SC:COLOUR3:PRINTTAB(27,23)"cans"
1260 IF SC>HS THEN HS=SC:COLOUR2:PRINTTAB(6,27)"YOU ME
     THE NEW HIGH SCORER ! ! !":COLOUR3:INPUTTAB(7,30)
     "PLEASE ENTER YOUR NAME"SPC(1)HH$:REPEAT
     UNTILLEN(HH$)<=7 ELSE 1280
1270 COLOUR3:PRINTTAB(2,12)"THE HI IS "SPC(1);HS"
     SCORED BY:";HH$
1280 COLOUR2:PRINT    SPC(7)"PRESS SPACE BAR TO CONTINUE"
     :REPEAT UNTIL GET=32
1290 ENDPROC
1300DEFPROCagain
1310CLS
1320VDU19,0,0,0,0,0
1330COLOUR3
1340PRINTTAB(5,10)"Do you want another go ?";:A$=GET$
1350IF A$="Y" OR A$="y" OR LEFT$(A$,1)="Y" OR LEFT$(A$,1)
     = "y" THEN CLS:R=INKEY(100):RUN ELSE END
1360ENDPROC
1370DEFPROCcompleted
1380 V=INKEY(100)
1390 CLS
1400 VDU19,0,6,0,0,0:COLOUR2
1410SOUND1,-15,80,10
1420 SOUND2,-15,82,10
1430SOUND3,-15,84,10
1440SOUND1,-15,86 10
1450SOUND2,-15,88,10
1460SOUND3, 15,90,10
1470SOUND1, 15,92,10
1480SOUND2,-15,94,10
1490SOUND3,-15,96,10
1500SOUND1,-15,98,10
1510SOUND2,-15,100,10
1520SOUND3,-15,102,10
1530 PRINTTAB(5,3)CHR$224
1540 PRINTTAB(30,3)CHR$224
1550 COLOUR3
1560 PRINTTAB(10,3)"MISSION COMPLETED
1570 COLOUR1
1580 PRINTTAB(5,6)"NEIL"
1590 PRINTTAB(30,6)"BARNES"
1600 COLOUR3:PRINTTAB(3,10)"OK,so you managed to last the
     whole     200 miles,collecting ";:COLOUR1:PRINT;SC;:
     COLOUR3:PRINT;" oil cans,but      do you know your
     overall rating""
1610 B=INKEY(400)
1620 PRINTTAB(5,15)"0-5   OIL CANS":COLOUR2:PRINTTAB
     (25,15)"THE PITS!"
1630 COLOUR3:PRINTTAB(5,17)"6-10  OIL CANS":COLOUR1:
     PRINTTAB(25,17)"WAKE UP!"
1640 COLOUR3:PRINTTAB(5,19)"11-15 OIL CANS":COLOUR2:
     PRINTTAB(25,19)"NOT BAD "
1650 COLOUR3:PRINTTAB(5,21)"15-20 OIL CANS":COLOUR1:
     PRINTTAB(25,21)"PRETTY GOOD ! "
1660 COLOUR3:PRINTTAB(5,23)"20-30 OIL CANS":COLOUR2:
     PRINTTAB(25,23)"FAR OUT,MAN ! "
1670 COLOUR3:PRINTTAB(7,30)"Press":COLOUR1
1680 PRINTTAB(13,30)"SPACE BAR";COLOUR3
1690 PRINTTAB(23,30)"to continue"
1700 REPEAT UNTILGET=32
1710 PROCagain
1720 ENDPROC
1730 DEFPROCinstruct
1740 VDU19,0,5,0,0,0
1750 COLOUR1:PRINTTAB(12,3)"POLE POSITION"
1760 COLOUR3
1770 PRINTTAB(2,7)"In this car racing game you control
     the FORMULA 1 car
1780 COLOUR2:PRINTTAB(20,8)CHR$224
1790 COLOUR3:PRINTTAB(22,8)" trying to collect
     as many oil cans
1800 COLOUR2:PRINTTAB(19,9)CHR$227
1810 COLOUR3:PRINTTAB(21,9)"as possible,while
     avoiding the skulls"
1820 COLOUR2:PRINTTAB(22,10)CHR$226
1830 COLOUR3:PRINTTAB(2,15)"To gain status,however,you
     must travel  for 200 miles "
1840 PRINTTAB(2,19)"KEYS:"
1850 COLOUR2:PRINTTAB(2,20)"----"
1860 COLOUR3:PRINTTAB(15,22)"A - LEFT"
1870 PRINTTAB(15,24)"L - RIGHT"
1880 PRINTTAB(2,30)"Press SPACE BAR to play":
     REPEATUNTILGET=32
1890 CLS
1900 ENDPROC
```

And pigs will fly . . .

***Graham Taylor** talks to Matthew Smith and Alan Maton of Software Projects*

Alan Maton is not merely the only man in Liverpool to wear white shoes as a sideline he manages Software Projects — home of *Manic Miner* and *Jet Set Willy* Between them the two games have been responsible for more terror anxiety, adrenalin insanity and (probably) broken relationships than *Crossroads*

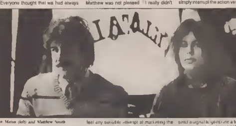
Legends abound about the author of the *Miner* programs, many of them very silly indeed — what sort of mind could it be that conceived of the bouncing, beckoning fat ladies, clockwork penguins moon faced, slightly famous computer programmers and flying pigs as appropriate obstacles in a computer game In fact, on close examination Matthew Smith proves to be not only humanoid, but apparently, perfectly sane

The story of how Alan Maton came to form Software Projects, with Matthew Smith as part owner and main programmer is however, suitably odd As most people know *Manic Miner* was originally issued by Bug-Byte a well respected software house also based in Liverpool What may be less obvious was the fact that Software Projects was being set up by Matthew Smith and Alan Maton quite independently from Matthew Smith s work on *Manic Miner* — they never expected to issue it themselves

'Everyone thought that we had always collecting objects in a series of caves was mine but I was thinking of something fairly straight — I had not expected Matthew to come up with cases populated with Penguins Eugenes kangeroos and toilet seats They aren t your standard aliens after all he added, slightly ruefully

To no-one's surprise Bug-Byte accepted the program and within a month of release it was possibly the most highly regarded Spectrum arcade game ever *Manic Miner* was successful for dozens of reasons but two seem particularly important Firstly, each screen was carefully designed so that there was only one or perhaps two ways of getting through — one false step and you got the boot Secondly, it was very funny and proved that obstacles didn't have to look machd and threatening to raise the adrenalin (I shake at David Attenborough wildlife films featuring penguins but maybe I always did) Finding genuine wit within a game was a revelation

What, in retrospect appears obvious may not have always seemed so when first released *Manic Miner* was just one program in a batch of several — not especially segregated or differentiated from the rest Indeed for a long while it didn t even appear first in the adverts Needless to say, Matthew was not pleased I really didn't



Alan Maton (left) and Matthew Smith

feel any sensible attempt at marketing the program was taking place at all — the cover of the cassette was pretty awful too "

planned to take *Miner* away from Bug-Byte but it wasn t like that at all explained Alan "The idea of Software Projects had been kicking around for a while

Alan worked at Bug-Byte in which capacity he met Matthew whose first program *Styx* had been accepted for marketing by the company The original idea for *Manic Miner* was Alan s "The name and the basic idea of a miner

A few months after it had been released and was beginning to do really well, Software Projects was ready to be launched as a company Mathew discovered that a clause in his contract with Bug-Byte entitled him to issue the game himself and take it away from them "Basically there was a clause which said that should a game be withdrawn from the market upon written request, it would be returned to the programmer — I don't think anyone had expected that a programmer would withdraw his own game!'

Bug-Byte had sufficient reserves of the game to see them over the Christmas period and only recently have Software Projects copies become the more widely circulated — the two games are the same but for a few changed graphic shapes.

Technically *Manic Miner* did several things supposedly impossible on the Spectrum — flicker-free sprites no colour resolution problems and, in some ways most spectacular of all, continuous sound I asked Matthew how these were achieved but anyone hoping for amazing technical innovations will be (somewhat) disappointed

The answer to all those problems is simply care. Flicker-free sprites are perfectly possible on the Spectrum, if the coding is right. Equally, whilst you can t solve the colour resolution problem, you can ensure that colour conflicts do not occur simply by planning everything carefully.'

Worth remembering next time you're looking at flickering, oddly coloured shapes in games Although *Miner* showed that continuous sound was possible, few other software houses have risen to the challenge of providing it "The sound is not difficult to do in terms of complex coding but working out the tune takes ages — you simply interrupt the action very frequently to send a signal to generate a tone — the skill comes in making it sound like a recognisable tune I use a little Casio to help me work out the notes

What about the actual structure of the game? How does Matthew make each screen just possible to do (if *Willy* stands on his head whilst grabbing a rope and jumping twelve fat ladies)? 'The answer is I spend ages and ages working it out — there's no easy solution I wish there was!

The only help Matthew does have in the development of his programs is a special macro language which is chiefly concerned with storing the character position of the aliens "It means that each alien position can be stored in only two bytes so it's very economical on memory '

From the moment the word on *Manic Miner* went around people were eagerly anticipating its follow up In the end it was well over six months before it arrived Alan agrees it was late 'Matthew kept saying to me It'll be finished by Monday — a lot of Mondays came and went Quite simply, the program grew and grew Matthew kept adding more and more rooms until at about 50, I decided we had to stop '

The arrival of *Jet Set Willy* saw major distributors acting with a lack of their usual decorum — after all, salse of the progam were absolutely guaranteed, provided no other shop beat you to it

Alan remembers the night well when the first copies arrived 'It was a bit like the first bottle of Beaujolais Everyone went mad trying to rush them into the shops We had people turning up at our offices all through the night — one guy flew up from London by plane rushed in with his docket collected his copies and flew back on the same plane which he had waiting for him ' Most people who rushed in to buy several hundred copies were back within the week for more

Matthew's computer expertise began with a Tandy he had had since 1979 I taught myself machine code programming using it and now I use a TRS 80 as a development system hooked up to the Spectrum "

He is doubtful about the Spectrum s future "I really think we ve reached just about the end of what s possible on the machine We have sprites on a machine that doesn t come with any, some attempt at continuous sound when the hardware doesn t allow for it, 16 colours when there are only supposed to be eight and games nobody would have dreamed you could have fitted into 48K — that s the limit I think. '

Matthew sees the games he produces as adventures, which use only three simple commands "The twists and skills required for *Jet Set* have much more in common with adventures than arcade games and if you get reasonably competent, an average game could last an hour or more — it's just that there's nothing to type in

"It's an area I plan to explore more, but not on the Spectrum "

Matthew and Alan are waiting for a clear contender to emerge to replace the Spec trum "I m uncertain about the QL. People rave about it, but the 68008 chip is not so far different from the 6809 which is in the Dragon It might not be good enough but obviously I m waiting to se a machine close up — I like the look of the MSX machines and perhaps the new Amstrad

As to future plans for Software Projects the most welcome news must be that, like all the best epics, the *Willy* saga is to be a trilogy Matthew is understandably reluc tant to put a date on part three, but it won t be soon

What can be revealed is that it will almost certainly be called *Willy and the Tax Man* and will involve *Willy* trying to find his way through a maze of inland revenue offices in order to pay his income tax (probably capital gains too, given all that gold he found) However, Matthew promises a series of three games before Christmas "They'll be basically space games, although with some special features," he added mysteriously

From Alan's point of view, Software Projects is at an important point "We need to build up a large range of respected and popular titles. We can t just rely on Matthew — we are developing an in-house programming team with Matthew acting as sort of overall supervisor and technical advisor Anything that s good we ll issue I don t want us to become just the manic miner software house

The bard bytes back

Christine Erskine suffers slings and arrows as she annotates her way through the new educational programs from Penguin

Games programs have long had everything their own way in the home computer market. While educational software has been largely aimed at primary schoolchildren, there has been a marked lack of material for those at a more advanced level.

A number of companies have spotted this gap in the market and are beginning to bring out educational programs aimed at the older student.

One somewhat unlikely party, on the face of it, is Penguin Books, who has just produced a series of six English Literature titles in program form, designed specifically for students of CSE or O Level standard.

Predictably enough, they have started with Shakespeare. The titles are those plays most commonly studied at this level - *Romeo and Juliet, Macbeth, Henry IV Part I, The Merchant of Venice, Twelfth Night* and *Julius Caesar*.

The programs are intended for the student revising at home — initially they will be available for Spectrum 48K with BBC and Electron versions out in May, and for Commodore 64 in August.

Shakespeare may be spinning in his grave at the thought of being neatly packaged for the micro but Penguin are extremely enthusiastic about the project. They have gone as far as to term it the first truly revolutionary breakthrough in the study of literature since the invention of printing. Rather more realistically they have also claimed it is possibly the best piece of educational software coming out in 1984.

Each program starts with a menu of three items: people, themes and Acts. Select people and you get a list of the important characters of the play. Select themes' and a list of the dominant themes appears. You can choose whether to study one character or one theme throughout the play, or in conjunction with one or two other characters or themes, or in a specific Act or Acts.

Having made a choice, the program then searches through passages relevant to the inquiry. It is here, in the treatment of material, that the program becomes quite distinct from other educational software packages.

There are no gimmicks such as fancy graphics to illustrate the information and no neatly presented questions and answers.

An exact line reference (from the Penguin Books edition, naturally) is given for each relevant point and a short line of comment appears on the display. The comments range from explaining the line reference given, to more frequently asking you to consider the significance yourself. In other words it is not too dissimilar from a discussion session in the classroom. It soon becomes apparent that it is impossible to use the programs to any effect without a copy of the text open in front of you.

The authors of the programs, John Mahoney and Stewart Martin, are keen to emphasise this point — the software is a supplement to the text and in no way a substitute.

John and Stewart spent about two years compiling the programs. Both English teachers in Kent, they also had considerable computing experience behind them.



They felt that much of the then available educational software was inadequate, and that the technique of using mindless guessing games" — to quote John — gave very little concrete help to students. They found also when presenting courses for teachers interested in software that many teachers were daunted by the difficulty of running some programs.

John and Stewart soon came to the conclusion that in order to see the sort of software on the market that they wanted, they were going to have to write it themselves.

They decided that using a menu to select the topics for study would make the programs simple to operate, and compiled and wrote out the display notes from there. This stage took them two years.

They then rang various publishers and contacted Penguin Books just as Penguin had decided it would move into the software market. They were signed up almost immediately.

Indeed, Penguin was so keen that a third person, Randle Hurley, an acquaintance of the authors, was drafted in to help transfer part of the programs into machine code in time to meet Penguin's deadline.

Both John and Stewart have now resigned from their teaching posts and are setting up their own educational software. They will be producing programs for 20 more literature texts for Penguin and then they will contract out work in five other subject areas: Maths, Physics, Chemistry, Biology and Geography, also for Penguin.

The titles of the 20 other texts have not yet been finalised, but they will be moving away from Shakespeare and will include novels, and will almost certainly be standard O Level set works. Whether D H Lawrence for instance lends himself to the same menu pattern as used for the first six remains to be seen, and both John and Stewart admit that the operation of the programs may have to be modified somewhat when dealing with novels.

Looking at the Shakespeare programs, the menu selection does seem to suit the nature of studying the plays at this level. Most 'O' Level exam questions ask the candidate either for a character study or a theme study or a conjunction of the two, and here the programs follow closely the type of revision a candidate is likely to undertake.

The authors have tried, however, to make constant reference to other parts of the play and other characters and themes on the displays. Nevertheless, you are still left with the impression that each character and theme can be neatly lifted from the play and studied as a quite separate entity.

This regrettable aspect of 'O' Level teaching is aggravated, I think, by the fact that there is no print-out facility on the programs. If you could research your chosen topic on the micro and then have a print-out, along with all the cross-references given along the way, it would help to show not only the topic as a whole, but also all the links to the rest of the play.

For example, a favourite 'O' Level question is one that links Hotspur in *Henry IV Part I* with the theme of Honour. Honour is generally considered to be one of the major

themes of the play and certainly the program throws up several references if you select Hotspur + Honour to research. Equally interesting however is the number of cross-references made especially if you look at Honour without requesting Hotspur as well. You are asked to consider every character in the play and referred to over half the other themes during the course of the search. If you looked at the search for Honour as a whole on a print-out it would become immediately apparent that Honour is a major theme because it holds many of the play's strands together and not just for its own sake.

Select a theme!

The authors plead lack of time and their desire for simplicity as the reason for not including a print-out facility. It would be nice to see it planned for future titles.

Their avowed intention to make you discover things for yourself rather than handing all information over on the screen is undoubtedly admirable, though occasionally frustrating.

Frequently the display passage for a particular line reference simply says: What does this remind you of? or Where else in the play is this mentioned? Fair enough but if you can't find the answer the program isn't immediately useful.

Occasionally I think they take this approach too far.

If you select Witches + Darkness to investigate on *Macbeth*, you will come across a display relating to Act 2, Scene 3 Line 68 which reads, 'Look up the word "gorgon" in a good dictionary — what echo do you hear — notice how throughout the play it is always present.'

You are already armed with a battery of equipment: a computer, a Penguin Study Software cassette and a copy of the text. Now you have to go and get the dictionary as well — and how do you know if it is good enough? It would not have overstrained 48K of memory to have inserted the required definition of gorgon in the program.

As the programs are entirely the work of two people, the selected references are naturally eclectic and as the authors have many years experience of teaching English Literature to this standard, the information and comments conform wholly to O Level teaching content. You do however have to beware of over-estimating the programs' thoroughness. While it is tempting to play with the menu in the hope of unearthing fascinating links within the play, the serious student is best advised to look at the topics as widely as possible.

Suppose you wished to investigate the romantic element in *The Merchant of Venice* — a fairly strong theme.

It is unwise to be specific here. Select Portia + Bassanio + Romance and you will receive just one reference. Try Portia + Romance and the program yields three references. Neither gives you very much to go on.

Look for details of the subplot romance and you will receive even less. For Jessica + Lorenzo + Romance there are no references at all except the screen that appears each time there are no references, telling you that you are searching for a combination that will not help your understanding of the play.

In this case it is obviously not quite true and in fact the way to get the most out of this subject is to look at Romance on its own — you will find plenty of references and also discover that Romance in *The Merchant of Venice* is related to far more than just the characters themselves.

Explanation of image and forward reference

One slightly annoying aspect of this is that it means you may have to go through a lot of material to find one particular reference you are looking for. And although you can break off a search at any time by pressing *Edit* (on the Spectrum) there is no scroll back facility if you wish to refer back to something in the search. You will just have to go back to the beginning and start again.

Pick single item to be studied in depth

In general the programs contain very little that would not come up in the course of a two year O Level syllabus.

Because of this I feel that they are not so much a study aid as a revision aid. Someone with no knowledge of the plays would not gain much understanding of Shakespeare's work by sitting down with one of the programs as they are written with a very narrow usership in mind — The CSE/O Level student with exams fast approaching. Some students may well be disappointed by the unrelievedly serious approach of the programs.

The content of the searches themselves will not so much teach you something new about the plays as remind you of notes you should have already — but it is quite possible that it will suggest a different way of looking at some aspects.

There is no reason either why the A Level student shouldn't find the programs useful though necessarily on a more superficial level. The authors say that they have heard from older students (using pre-production tapes at the schools where the authors taught) who had gained much from using them.

Certainly Penguin's Literature software will be a hard act to follow. The programs have managed to balance reasonably sophisticated information with simplicity in presentation.

The tabulation of information according to line reference makes the comments very clear although it would be dangerous if the user gained the impression that only the parts of the play quoted in the Penguin Study Software Package were relevant.

But I feel the attempt to present the software as genuinely educationally useful has been largely successful, and I shall be very interested to see *Lord of the Flies*, *To Kill a Mockingbird* and the rest of the GCE Greatest Hits when they appear.


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Tuned in

***Roy Meesfield** presents a program for radio-frequency tuned circuits*

Were it not for the convenient behaviour of inductors, capacitors and resistors in so-called tuned circuits, radio communication and TV as we know them, would be impossible

An inductor which is really nothing more than a coil of wire, has the property of storing energy in the form of a magnetic field, a capacitor, which is two large surfaces separated by an insulator, stores energy in the form of an electric field When an inductor (L) and capacitor (C) are connected together as in Figure 1(a) and a current is started in the circuit, then the energy oscillates between the two components

The rate of oscillation, or frequency (f), depends only on the numerical values of L and C If L is in Henries (the unit of inductance) and C is in Farads (the unit of capacitance), then the frequency is given by

$$f_0 = \frac{1}{2\pi\sqrt{LC}}$$

This particular frequency, f_0, is known as the resonant frequency of the combination In radio applications it is more usual to express L in micro-Henries (uH) and C in pico-Farads (pF), and in the formulae given hereafter these units are assumed Of course in any practical circuit there will be some resistance (Rohms), chiefly associated with the wire of the coil, and energy will be dissipated in this, so the current would soon die away as indicated in Figure 1(b)

However if we connect an alternating current (a c) generator to the circuit as in Figure 2, then if the frequency of the generator is the same as the resonant frequency of the circuit, the oscillations can be kept going strongly with very little input from the generator — in fact, only just enough to make up for the loss in R It is analogous to the way that the pendulum of a clock can be kept swinging by quiet small pushes from the escapement at just the right frequency

The whole point, though of these tuned circuits is that at resonance the voltage across either L or C in the series circuit can be much greater than the applied voltage, while in the parallel case the current through these components is greater than that from the generator

We are not getting something for nothing because these voltages and currents are in anti-phase and cancelling so we can't draw more power from the circuit than we put in Nevertheless, the voltage across say the capacitor can be applied to an amplifier and in that way we can get our power gain

At frequencies other than resonant the voltage or current is less than that at resonance, so this gives us a way of tuning to any desired frequency If we replace our generator by an aerial which is picking up many signals over a wide range of transmitted frequencies, we can select the one we want by a suitable combination of L and C Figure 3 shows in a general way how the voltage across the capacitor in a series circuit depends on the applied frequency

Well how is a computer going to help? If we want to plot a response curve like Figure 3, we have to know the impedance (Z) of the circuit at any frequency (Impedance is the 'resistance of the circuit to a c and is measured in Ohms) It is a simple mater to find Z at f_0 because the reactance of the inductor (X_L) is equal but of opposite kind to that of the capacitor (X_C) and so they cancel Reactance is the 'resistance' of L or C at a c and is given by the formulae

$$X_L = 2\pi fL \times 10^{-6} \text{ and } X_C = \frac{1}{2\pi fC \times 10^{-12}}$$

The overall impedance in a series circuit is just R at resonance and is greater at all other frequencies, while for a parallel circuit the impedence is L/CR at resonance and less at other frequencies In a short article like this it would be impossible to derive these results, but they can be found in any good radio text-book

When we come to impedance off resonance, the formulae become rather formidable

For the series case

$$Z = \left[R^2 + \left(2\pi fL \times 10^{-6} - \frac{1}{2\pi fC \times 10^{-12}}\right)^2 \right]^{1/2}$$

For the parallel

$$Z = \left[\frac{R^2 + 4\pi^2 f^2 L^2 \times 10^{-12}}{(1 - 4\pi^2 f^2 L\ C \times 10^{-18})^2 + 4\pi^2 f^2 C^2 R^2 \times 10^{-24}} \right]^{1/2}$$

To plot the response curve means working out these impedances and converting to decibels (dB s) for a fair number of frequencies on each side of resonance, and this is indeed laborious Hence the computer program

While we are at it, other useful properties of tuned circuits can be evaluated One of these is the Q factor sometimes called the 'magnification of the circuit It is the ratio of

Fig.1

Series

Parallel

Fig.2

Fig.3

Fig.4

the reactance of the coil at f_0 to its resistance, $Q = X_L/R$ and it has no units. It is just a number. It is a kind of measure of the 'goodness' of the coil and helps to show if a circuit is going to be good at separating one signal from another. High values of Q are associated with low values of R, and the response curves peak sharply.

The other useful property to know is the bandwidth (f_b): this is the range of frequencies over which the response is greater than $1/\sqrt{2}$ of its peak value. On the curve the points where this occurs are called the minus 3 dB or half-power points as shown in Figure 4.

Now to the program. When it is Run, the display will be as in Figure 5, and you must enter values for L, C, r and f_0. Where any of these is unknown, enter a ?. If too many question marks are entered you will be told there is insufficient data for calculation of all the answers. Thus if R is not known it will be impossible to find Q and f_b, while for L, C and f_0 any two must be known if the third is to be found.

After the data is in, calculation proceeds and the display will be as in Figure 6. It is then possible to go on to the frequency response as directed, assuming R is known or is not zero. There is a choice of series or parallel configuration. In either case the values of Z can be calculated for specific frequencies, or a response curve can be drawn for a range of frequencies 30kHz on each side of f_0 as in Figure 7.

Apart from giving specific answers, this program will also demonstrate the effect of resistance on the response. For the same values of L, C and f_0, curves can be drawn with different values of R and so direct comparisons made. A printer is useful to give a record of each curve.

continued over the page ▸


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Character references

***Mark Lawrence** explains how to print 64 characters per line in the first of a new series on machine code*

This is a utility routine which can be incorporated in your own program allowing printing of 64 characters to each of the 24 lines so that much information can be displayed on the screen

The complete routine, including 768 bytes of data for the smaller character set, occupies just 1000 bytes and you should find it simple to use Whenever you want to print in this way simply add two lines like this

```
10 RANDOMIZE USR 31600
20 REM AT 10 10 — "message"
```

The — represents a space and REM and At are the Basic keywords It is important to follow this format and make sure that the information to be printed is on the line following the USR call as the routine uses the system variable Nxtlin, which holds the address of the next line in a basic program

Type in the hex loader and enter 31600 to the prompt for a start address Now enter the code and *Save"64print"Code 31600 1000* then verify it Now enter an example such as

```
10 RANDOMIZE USR 31600
20 REM AT 10 10 — "This is a great program"
```

Now run it. If all is well the message should be printed If it is not printed, enter the check program and check the code against the listing, *Poking* any incorrect entries

```
LIST
  10 LET a$="0123456789ABCDEF"
  20 INPUT "Enter start address";s
  30 LET b$=a$(INT (PEEK s/16)+1)+a$(1+
(PEEK s-16*(INT (PEEK s/16))))
  40 PRINT b$;"  ";
  50 LET s=s+1:GOTO 30

LIST
  10 LET a=10:LET b=11:LET c=12:LET d=1
3:LET e=14:LET f=15
  20 INPUT "Enter Start Address ";s
  30 INPUT "Enter code  ",a$
  40 IF LEN a$/2<>INT (LEN a$/2) THEN P
RINT "Error in input.please retry":GO TO
 30
  50 POKE s,VAL a$(2)+16*VAL a$(1)
  60 PRINT a$( TO 2),"  ";
  70 INPUT INKEY$="Y"
  80 LET s=s+1:LET a$=a$(3 TO )
  90 IF a$<>"" THEN GO TO 40
 100 GO TO 30
```

64 PRINT CODE

7B70	2A	55	5C	23	23	4E	23	46
7B78	23	23	23	00	00	00	7E	23
7B80	00	5E	CD	81	7B	32	43	7C
7B88	23	00	7E	23	00	5E	CD	81
7B90	70	23	00	00	00	E5	C5	4F
7B98	3A	43	7C	CD	9E	0E	AF	C8
7BA0	35	30	01	3C	32	42	7C	7D
7BA8	01	0F	C1	D1	13	CD	CF	7B
7BB0	C5	F5	7B	FE	30	38	05	23
7BB8	00	F1	18	04	F1	5F	3E	30
7BC0	D6	30	F5	7B	D6	30	5F	F1
7BC8	87	57	87	87	82	83	C9	CD
7BD0	F3	78	13	3A	42	7C	FE	01
7BD8	28	0A	23	7D	FE	00	20	04
7BE0	7C	C6	07	67	3A	42	7C	3C
7BE8	E6	01	32	42	7C	88	78	81
7BF0	28	DD	C9	C5	D5	E5	CD	16
7BF8	7C	11	43	7C	3A	42	7C	0E
7C00	0F	FE	01	20	02	0E	F0	06
7C08	00	E0	1A	A1	06	12	23	14
7C10	10	F8	E1	D1	C1	C9	E5	E0
7C18	11	43	7C	7E	D6	20	6F	26
7C20	00	29	29	29	01	40	7C	09
7C28	06	08	4E	3A	42	7C	FE	00
7C30	20	08	CB	39	CB	39	CB	39
7C38	CB	39	79	12	23	13	10	EA
7C40	E1	C9	00	00	00	04	0A	0A
7C48	0A	04	00	00	00	00	00	00

7C50	00	00	00	00	40	40	40	40
7C58	00	40	00	00	50	A0	00	00
7C60	00	00	00	00	00	A0	E0	A0
7C68	E0	A0	00	00	40	E0	00	40
7C70	20	C0	40	00	00	D0	E0	70
7C78	50	00	00	00	00	40	A0	40
7C80	A0	50	00	00	20	40	00	00
7C88	00	00	00	00	40	80	80	80
7C90	80	40	00	00	40	20	20	20
7C98	20	40	00	00	00	A0	40	E0
7CA0	40	A0	00	00	00	00	40	E0
7CA8	40	00	00	00	00	00	00	40
7CB0	40	80	00	00	00	00	00	E0
7CB8	00	00	00	00	00	E0	00	00
7CC0	00	80	00	00	20	20	40	40
7CC8	80	00	00	00	40	A0	A0	E0
7CD0	A0	40	00	00	40	C0	40	40
7CD8	40	E0	00	00	40	A0	20	40
7CE0	00	E0	00	00	E0	20	40	20
7CE8	A0	40	80	90	20	60	A0	A0
7CF0	F0	20	00	00	E0	80	C0	20
7CF8	A0	40	00	00	60	80	C0	A0
7D00	A0	40	00	00	E0	20	20	40
7D08	40	40	00	00	40	A0	40	A0
7D10	A0	40	00	00	60	A0	A0	60
7D18	20	20	00	00	00	40	00	40
7D20	00	00	00	00	00	40	00	40
7D28	40	80	00	00	00	20	40	00
7D30	40	20	00	00	00	00	E0	00
7D38	E0	00	00	00	00	30	40	20
7D40	40	80	00	00	E0	20	40	40

7D48	80	40	00	00	00	40	E0	E0
7D50	80	00	00	00	40	A0	A0	E0
7D58	A0	A0	00	00	C0	A0	C0	A0
7D60	A0	C0	00	00	40	A0	60	80
7D68	A0	40	00	00	C0	A0	A0	A0
7D70	A0	C0	00	00	E0	00	C0	00
7D78	80	E0	00	00	E0	80	C0	00
7D80	80	00	00	00	40	A0	80	E0
7D88	A0	80	00	00	A0	A0	A0	E0
7D90	A0	A0	00	00	E0	40	40	40
7D98	40	E0	00	00	E0	40	40	40
7DA0	40	00	00	00	A0	A0	C0	C0
7DA8	A0	A0	00	00	80	80	80	00
7DB0	00	E0	00	00	A0	E0	A0	A0
7DB8	A0	A0	00	00	A0	A0	E0	A0
7DC0	A0	A0	00	00	40	A0	A0	A0
7DC8	A0	40	00	00	C0	A0	A0	C0
7DD0	00	60	00	00	40	A0	A0	A0
7DD8	E0	60	00	00	C0	A0	A0	C0
7DE0	A0	A0	00	00	60	00	40	20
7DE8	20	C0	00	00	E0	40	40	40
7DF0	40	40	00	00	A0	A0	A0	A0
7DF8	A0	40	00	00	A0	A0	A0	A0
7E00	40	40	00	00	A0	A0	A0	A0
7E08	E0	A0	00	00	A0	A0	40	40
7E10	A0	A0	00	00	A0	A0	40	40
7E18	40	40	00	00	E0	20	40	40
7E20	00	E0	00	00	C0	00	00	00
7E28	60	C0	00	00	00	00	40	40
7E30	[illegible]	20	00	00	C0	40	40	40
7E38	10	C0	00	00	40	E0	40	40
7E40	10	[illegible]	00	00	00	A0	00	00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]

7E50	00	E0	00	00	00	40	[illegible]	[illegible]
7E58	A0	60	00	00	00	00	80	[illegible]
7E60	A0	C0	00	00	00	40	A0	[illegible]
7E68	A0	40	00	00	00	20	70	[illegible]
7E70	A0	00	00	00	00	40	A0	[illegible]
7E78	80	60	00	00	00	60	80	[illegible]
7E80	00	80	00	00	40	60	A0	[illegible]
7E88	20	C0	00	00	00	80	80	[illegible]
7E90	A0	A0	00	00	00	40	00	[illegible]
7E98	40	40	00	00	00	20	[illegible]	[illegible]
7EA0	A0	40	00	00	00	A0	[illegible]	[illegible]
7EA8	A0	A0	00	00	00	00	00	[illegible]
7EB0	00	60	00	00	00	40	E0	[illegible]
7EB8	A0	A0	00	00	00	40	A0	[illegible]
7EC0	A0	A0	00	00	00	40	A0	[illegible]
7EC8	A0	40	00	00	00	C0	F0	[illegible]
7ED0	00	00	00	00	00	00	A0	60
7ED8	20	38	20	00	00	60	00	00
7EE0	00	00	00	00	00	00	00	40
7EE8	70	F0	00	00	20	00	C0	00
7EF0	A0	40	00	20	00	A0	A0	A0
7EF8	A0	40	00	00	00	A0	A0	A0
7F00	40	10	00	00	00	A0	A0	A0
7F08	10	A0	00	00	00	A0	A0	40
7F10	A0	A0	00	00	00	A0	A0	60
7F18	70	A0	40	00	90	E0	20	40
7F20	00	E0	00	00	20	40	00	40
7F28	10	20	00	00	40	40	40	40
7F30	40	40	00	00	00	40	20	40
7F38	40	00	00	00	50	A0	00	00
7F40	00	00	00	00	00	90	F0	00
7F48	F0	00	00	00	00	00	00	00
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]



METAGALACTIC LLAMAS BATTLE AT THE EDGE OF TIME
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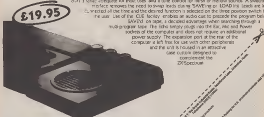
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Take the plunge

***Jason Orbaum and Geoffrey Campbell** discuss Assembly language programming in the first of a series of six articles*

Many people have now owned their Dragon for more than a year and have got past the stage of timidly approaching the keyboard to attempt Basic programs such as 'Guess the number the computer is thinking of" or "Maths quiz" Those who wish to write faster more 'powerful programs have three choices They can buy a compiler which will turn a subset of the Basic into machine code they can purchase another language such as Forth or Pascal and learn that or they can go to the heart of the Dragon and take the plunge into assembler (machine code)

There are no end of books coming onto the market on the subject of machine code, but hardly any of these books offer examples of cooing in the form of Britain s most popular computer activity — games

This series of articles hopes to change that. Armed with these, and a good assembler (about which more later) the beginner should find himself writing good programs in no time at all

The chip that controls the Dragon is the 6809E from Motorola. It is one of the most powerful chips of its sort (eight-bit) on the market and is an excellent chip to learn on

The way the user communicates with this chip and feeds it instructions is via an interpreter One example of this is the Basic interpreter, supplied with the computer through which most people enter their programs The interpreter takes each line, analyses it and executes the machine code routine in the Rom that is needed for that command

Another interpreter is the assembler without which Dragon machine code programming becomes almost impossible The assembler translates the mnemonics (instructions typed in by the user) into the numbers which the machine understands

The assembler used in all of these articles is *Dream* the assembler marketed by Dragon Data This assembler (the cassette based version) is quite suitable for the beginner, being easy to use and one of the cheapest widely available assemblers on the market

Now we will move on to the inside of the Dragon and a memory map This shows the internal arrangement of the Dragon, with an explanation of what each area of memory is used for

The direct page Ram (0–255) is used to storing addresses to which the computer jumps, in a similar way to the Basic *Goto*

Memory Map for use with Part 1

Hex Address	Contents	Decimal address
(Base sixteen)		(Base ten)
0-FF	Direct page RAM	0-255
100-3FF	Extended page RAM	256-1023
400-5FF	Text Screen	1024-1536
	Graphic Screens	
600-BFF	Page one	1536-3071
C00-11FF	Page two	3072-4607
1200-17FF	Page three	4608-6143
1800-1DFF	Page four	6144 7679
1E00-23FF	Page five	7680-9215
2400-29FF	Page six	9216-10751
2A00-2FFF	Page seven	10752 12287
3000-35FF	Page eight	12288-13823
1E00-7FFF	Program and variable storage	7680-32767
8000-BFFF	Basic interpreter	32768-49151
C000-FEFF	Cartridge memory	49152-65279
FF00-FF5F	I/O (Input/Output)	65280-65375
FF60-FFDF	SAM control bits	65376-65503
FFE0-FFFF	MPU vectors	65504-65535

The text screen area (1024–1535) is used to store the characters that make up the screen Many people access this directly from Basic using *Peek* and *Poke* Locations 1536–13823 are used in the same way as the text screen area, but they store the data on the hi-resolution screens

No doubt someone has noticed, that according to this memory map the program and variable are stored on graphics pages 5–8 This is not a typing error, but is due to the number of graphics pages that are initially reserved for use from Basic (via the *Pclear* command) This does not matter for machine code programs, as there will be no Basic program to overwrite If *Pclear 8* is entered from Basic, then program and variables all move up to 13823, on top of all eight graphics pages Listings one and two are two Basic programs to demonstrate some of these See if you can understand how they work and we will convert them to assembler at a later date

After this we have the Basic Interpreter, which is stored in Rom the contents of which cannot be altered by the user It may seem, therefore, that this area is of no use to the machine-code programmer This is not so, however, as there are quite a few useful Rom routines, as will be shown in a subsequent article

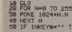
Next we have the cartridge memory This is similar to the Basic Interpreter but, as the cartridge has to be present to access the Rom in it we can safely ignore it

The last three sections Input/Ouput Sam control bits, and MPU vectors are mainly for system use They can be used by the programmer but are not needed except for advanced programs

In the next article, we will be taking a close look at the hardware behind all this and explaining listings one and two

Geoffrey Campbell (left) and Jason Orbaum

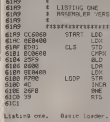
Listing one. Basic Version.



```
10 CLS
20 FOR N=0 TO 255
30 POKE 1024+N,N
40 NEXT N
50 IF INKEY$="" THEN GOTO 50
```

Listing two. Basic version.

```
10 CLS
20 PMODE 4,1
30 PCLS
40 SCREEN 1,1
50 FORN=0TO255
60 POKE 1568+N*2,N
70 NEXTN
00 IF INKEY$="" THEN GOTO 80
```



```
     61A9   **********************
61A9        *                    *
61A9        *  LISTING ONE       *
61A9        *  ASSEMBLER VERSION *
61A9        *                    *
61A9        **********************
61A9 CC6060      START   LDD    #$6060
61AC 8E0400              LDX    #$400
61AF ED81        CLS     STD     X++
61B1 8C0600              CMPX   #$600
61B4 25F9                BLO    CLS
61B6 8600                LDA    #0
61B8 8E0400              LDX    #$400
61BB A780        LOOP    STA     X+
61BD 4C                  INCA
61BE 26FB                BNE    LOOP
61C0 39                  RTS
61C1
```

Listing one. Basic loader.

Before typing in the loader type

CLEAR 500,25000 AND PRESS ENTER.

BASIC LOADER PROGRAM.

```
5 CS=0
10 FOR N=25001 TO 25024
20 READ A$
30 A=VAL("&H"+A$)
40 POKE N,A
50 CS=CS+A
60 NEXT N
70 IF CS<> 2337 THEN SOUND 1,1
   PRINT"DATA ERROR." END
80 PRINT"ALL CORRECT" SOUND
   200,1 END
90 DATA CC 60,60,8E,4,0,ED,81,8C,6,
    0,25,F9,86,0,8E,4,0,A7,80
100 DATA 4C,26,F8,39,0
```

```
61A9 ******************************
61A9 *                            *
61A9 *       LISTING TWO          *
61A9 *       ASSEMBLER VERSION    *
61A9 *                            *
61A9 ******************************
61A9 86F5        START   LDA    #245
61AB B7FFC3      PMODE   STA    $FFC3
61AE B7FFC5              STA    $FFC5
61B1 B7FFC7              STA    $FFC7
61B4 8A08                ORA    #8
61B6 B7FF22              STA    $FF22
61B9 CC0000              LDD    #0
61BC 8E0600              LDX    #$600
61BF ED81        PCLS    STD     X++
61C1 8C1E00              CMPX   #$1E00
61C4 25F9                BLO    PCLS
61C6 8E0600              LDX    #$600
61C9 ED81        LOOP    STD     X++
61CB 5C                  INCB
61CC 26FB                BNE    LOOP
61CE BD8006      KEY?    JSR    $8006
61D1 27F0                BEQ    KEY?
61D3 AD9FFFFE            JSR    [$FFFE]
61D7
```

Listing two. Basic loader.

Before typing in the loader type

CLEAR 500,25000 AND PRESS ENTER.

BASIC LOADER PROGRAM.

```
5 CS=0
10 FOR N=25001 TO 25047
20 READ A$
30 A=VAL("&H"+A$)
40 POKE N,A
50 CS=CS+A
60 NEXT N
70 IF CS<> 6402 THEN SOUND 1,1
   PRINT"DATA ERROR." END
80 PRINT"ALL CORRECT":SOUND 200,
   1 END
90 DATA 86,F5,B7,FF,C3,B7,FF,C5,B7,
   FF,C7,8A,8,B7,FF,22,CC,0,0,8E
100 DATA 6,0,ED,81,8C,1E,0,25,F9,
    8E,6,0,ED,81,5C,26,FB,BD,80,6
110 DATA 27,F0,AD,9F,FF,FE,39,0
```

Whistle while you work

John Meech *presents a program to help children learning to play the recorder*

This program is designed to help children who are just learning the recorder to become familiar with the notes. No attempt is made to teach music and the notes are given in the form of letters with the uncovered accompanying holes displayed.

Three tunes are contained within the program — *Whistle while you work*, *When the saints go marching in* and *Clementine*. They contain increasingly difficult notes with which the child must try to become familiar. Along with a selectable tempo this provides a useful system for children to practice using the computer as a teacher.

The program recognises 11 notes, as children who progress beyond these should be proficient enough to teach themselves. You may add tunes of your own using the notes specified. The format is [Note, Duration] where the note is given by a letter from *A* to *G*, followed by an *L* if the note is a low one or a # (shift 3) if the note is a sharp. For the appropriate duration see page 161 of The User Guide.

The tunes are stored in *Data* statements in lines 1330 to 1350. The first *Data* item is the length of the tune in notes, and the names of the tunes are stored at line 1310.

Notes

10-170	Dimension arrays, print title, draw border and draw Recorder
180-240	Call procedures to run main program
260-420	Draw the Recorder's holes. Each hole is a different colour from 7 to 15. This enables each hole to be opened using the VDU19 command
440-580	Disable escape key, remove cursor, define text window and characters for holes. Read Note values.
600-880	Select tune and speed. Play tune and display appropriate notes
910-960	Calculate note value to play
980-1020	Calculate duration of note and play note with appropriate fingering
1040-1100	Uncover appropriate fingerholes. This is done by setting the actual colour of the holes used to be white
1120-1160	Set all holes to be open again
1180-1350	Data for Recorder Notes and Tunes

```
10 DIM N$(7,2),L$(7,2),S$(7,2),NAME$(5)
20 REM ******************************
30 REM **** Recorder Tutor Program ****
40 REM **** (C) John F  Meech 1984 ****
50 REM ******************************
60 REM Covers A,B,C,D,G Low C,D,E,F and F# and High C#
70 MODE2
80 COLOUR1
90 PRINT TAB(6,1)"RECORDER"TAB(7,2)"TUTOR"
100 GCOL0,6
110 MOVE 0,0:DRAW 0,1023
120 DRAW 1279,1023:DRAW 1279,0:DRAW 0,0
130 FOR J=1 TO 39
140 READ X,Y
150 IF X=-1 AND Y=-1 READ X,Y:MOVE X,Y
160 DRAW X,Y
170 NEXT J
180 PROCINIT
190 PROCHOLES
200 REPEAT
210 DU$=INKEY$(300)
220 PROCSTART
230 UNTIL CH$="E"
240 END
250:
260 DEFPROCHOLES
270 VDU5
280 X=400:Y=796
290 FOR I=7 TO 15
300 VDU 19,I,4,0,0,0
310 GCOL0,I
320 IF I=7 OR I=8 OR I=15 GOTO 370
330 X=X+100
340 MOVE X,Y:PRINT CHR$(240)
350 NEXT I
360 GOTO 410
370 IF I=7 MOVE 400,732:PRINT CHR$(241)
380 IF I=8 MOVE 464,732:PRINT CHR$(242)
390 IF I=15 MOVE 1110,756:PRINT CHR$(243)
400 GOTO 350
410 VDU4
420 ENDPROC
430:
440 DEFPROCINIT
450 TN=3
460 *FX229,1
470 VDU23;11,0;0;0;0
480 VDU19,6,7,0,0,0
490 VDU28,1,30,18,18
500 VDU23,240,255,126,60,0,0,0,0,0
510 VDU23,241,0,0,0,0,0,3,7,15
520 VDU23,242,0,0,0,0,0,192,224,240
530 VDU23,243,12,12,12,0,12,12,0,0
540 FOR I=1 TO 7:FOR J=1 TO 2:READ N$(I,J):NEXT J:NEXT I
550 FOR I=1 TO 7:FOR J=1 TO 2:READ L$(I,J):NEXT J:NEXT I
560 FOR I=1 TO 7:FOR J=1 TO 2:READ S$(I,J):NEXT J:NEXT I
570 FOR I=1 TO TN:READ NAME$(I):NEXT I
580 ENDPROC
```

continued on page 35 ▶


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```
600 DEFPROCSTART
610 COLOUR1
620 CLS:PRINT"Please type in " the number of the " "tune you want to"
630 PRINT"play or 'E' to end"
640 COLOUR3:FORJJ=1 TO TN:PRINT;JJ;"   ";NAME$(JJ):NEXT JJ
650 CH$=GET$:IF CH$="E" ENDPROC
660 IF ASC(CH$)>51 OR ASC(CH$)<49 GOTO 650
670 CH=VAL(CH$)
680 COLOUR5:PRINT"Speed (1 to 9)"'
690 TE$=GET$
700 IF ASC(TE$)<49 OR ASC(TE$)>57 THEN GOTO 690
710 TE=VAL(TE$):PRINT;TE
720 IF CH=2 RESTORE 1340 ELSE IF CH=3 RESTORE 1350 ELSE RESTORE 1330
730 CLS:PRINT TAB(INT(18-LEN(NAME$(CH))/2));NAME$(CH)
740 DUM$=INKEY$(500)
750 COLOUR3:PRINT TAB(1,4)"Play-"
760 COLOUR6
770 READ L
780 FOR I%=1 TO L
790 READ NO$,DUR
800 PROCBLANK
810 PROCNOTE
820 TIME=0
830 PRINT TAB(7,4);NO$+"  "
840 PROCPLAY
850 REPEAT UNTIL TIME=INT(DUR/2*10)
860 NEXT I%
870 PROCBLANK
880 PRINT TAB(7,4)"
890 ENDPROC
900:
910 DEFPROCNOTE
920 B=ASC(MID$(NO$,1,1))-64
930 IF LEN(NO$)=1 THEN D$=N$(B,2):V=VAL(N$(B,1)):ENDPROC
940 IF LEN(NO$)=2 AND MID$(NO$,2,1)="L" D$=L$(B,2):V=VAL(L$(B,1)):NO$=LEFT$(NO$,1):ENDPROC
950 IF LEN(NO$)=2 AND MID$(NO$,2,1)="#" D$=S$(B,2):V=VAL(S$(B,1))
960 ENDPROC
970:
980 DEFPROCPLAY
990 DUR=DUR*4/TE
1000 SOUND 1,-15,V,DUR
1010 PROCFINGERS
1020 ENDPROC
1030:
1040 DEFPROCFINGERS
1050 FOR Z%=1 TO LEN(D$)
1060 FF$=MID$(D$,Z%,1)
1070 HO=6+VAL(FF$)
1080 VDU19,HO,6,0,0,0
1090 NEXT Z%
1100 ENDPROC
1110:
1120 DEFPROCBLANK
1130 FOR KK%=7 TO 15
1140 VDU19,KK%,4,0,0,0
1150 NEXTKK%
1160 ENDPROC
1170:
1180 REM ****** DATA TO DRAW RECORDER *******
1190 DATA -1,-1,40,760,60,760,120,740,160,700,180,690,200,700
1200 DATA 300,700,340,680,360,680,400,700,1100,700,1120,720,1160,720
1210 DATA 1200,680,1200,820,1160,780,1120,780,1100,800,400,800
1220 DATA 360,820,340,820,300,800,200,800,130,810,40,800,40,760
1230 DATA -1,-1,220,800,220,760,280,800,-1,-1,300,800,300,700
1240 DATA -1,-1,200,800,200,700,-1,-1,400,800,400,700
1250 DATA -1,-1,1120,790,1120,720,-1,-1,1160,790,1160,720
1260 REM ****** DATA FOR NOTES *******
1270 DATA 137,1234,145,123,149,124,157,4,0,0,0,0,129,12345,0,0
1280 DATA 0,0,101,123456789,109,12345678,117,1234567,121,12345689,0,0
1290 DATA 0,0,0,0,153,34,0,0,0,0,125,1234578,0,0
1300 REM ******* TUNE NAMES **********
1310 DATA Whistle,When the saints,Clementine
1320 REM ******* DATA FOR TUNES ********
1330 DATA 23,D,10,C,10,B,10,C,10,D,40,D,10,C,10,B,10,C,10,D,40,D,10,C,10,B,10,A,10,D,10,C,10,B,10,A,10,D,10,C,10,B,10,A,10,G,40
1340 DATA 33,G,10,B,10,C,10,D,40,G,10,B,10,C,10,D,40,G,10,B,10,C,10,D,20,B,20,G,20,B,20,A,40,B,10,B,10,A,10,G,20,G,10,B,20,D,20,D,10,C,20,C,20,B,10,C,10,D,20,B,20,B,20,A,20,G,40
1350 DATA 30,G,10,G,10,G,10,DL,10,B,10,B,10,B,10,G,10,G,10,B,10,D,10,D,10,C,10,B,10,A,20,A,10,B,10,C,10,C,10,B,10,A,10,B,10,G,10,B,10,B,10,A,10,DL,10,F#,10,A,10,G,20
```

Sequence of events

Pete Gerrard looks at sequential access on the disc drive

As anyone who has bought a disc drive for the Commodore 64 will know the manual supplied with it is not a model of clarity

Over the next few weeks we'll be taking a look at just some of the things that the 1541 disc drive can do

The first and most important thing to remember is that the Commodore disc drive is 'intelligent' This may seem a remarkable statement to someone who's attempted to use this drive and then got hopelessly muddled up! However its intelligence comes, not from being able to think for itself but from the fact that information can be stored in the disc drive just as it can be stored in the computer There is a 2K buffer that can be used to temporarily store information and to read information back from later and we'll be using this next week to start constructing a random access file

To start the ball rolling let's take a look at sequential files.

Sequential files

As the following listing shows (see fig 1), writing a sequential file is not too different on disc from the format used for tape Simply open the file (Line 10) using a File Number (2) a Device Number (8) and a Channel Number to send information down (2) Give it a name (*Fred*), and inform the computer that this is a sequential file and we're ready to write some data

Lines 20 and 30 are then just a loop to write the data onto disc, using the *Chr$(13)* character a carriage return as a separator between each item of data Then in Line 40, the file is closed and Line 50 informs the user that the data has been written

To read the data back again a file is opened in the same way as before (Line 60) except that this time the idea is to read some data, rather than writing it The data is read in one item at a time, and printed on the screen just to prove that it has actually been read properly (Lines 70 to 80) Line 90 then closes the file again and to finish off Line 100 informs the user that the data has been read

In the listing, Lines 15 and 35 are nothing to do with writing files but instead keep track of how long it takes the computer to print the information onto the disc Under normal circumstances, this is about 1 8 seconds (your result may be either slightly faster or slower — disc drives vary quite a bit)

This timing test can be used to show that it is possible to speed up the rate at which the computer is capable of sending data to or reading data from a disc

By blanking the screen during the reading or writing process everything can be made to happen approximately 10% quicker This is not very noticeable on a short program such as this (times become typically about 1 8 to 1 65 seconds), but on longer programs a 10% saving can be quite handy

To blank the screen, don't just clear it Enter a Line 12 *Poke* 53265,11 <*Return*>, and a Line 38 *Poke* 53265,27 <*Return*> This turns the screen off lets the computer do the work then turns it on again so that you can see the improved result Why should this speed everything up? Because the computer now only has to worry about writing data, rather than having to continually refresh the screen display as well

```
FIGURE 1 : SEQUENTIAL FILE DEMO


10 OPEN 2,8,2,"@0:FRED,S,W"
15 T=TI
20 FORI=1TO100
30 PRINT#2,I:CHR$(13);:NEXTI
35 PRINT:PRINT"TIME TAKEN = ";(TI-T)/60;" SECONDS."
40 CLOSE 2
50 PRINT"DATA WRITTEN.":FORI=1TO2000:NEXT
60 OPEN 2,8,2,"0:FRED,S,R"
70 FORI=1TO100
80 INPUT#2,A:PRINTA;:NEXTI
90 CLOSE2
100 PRINT:PRINT"DATA READ!":END
```

As a simple example of the sort of things that are possible fig 2 shows a program for examining other programs (or indeed itself!) stored on disc This is intended to be used as a sub-routine within another program being called up when necessary, so you may have to renumber it.

As you can see from fig 2, Lines 1000 to 1060 are data statements containing all the key-words or characters (only non-graphical characters, although you could extend the program to include them if necessary) to be found in a Basic program, whether it be Basic 2 as used by the 64 or any different form of Basic used by any other Commodore machine

This data is read into an array *A$* in Line 10 and if you can't get the program to work, then you've probably missed out one of the items of data somewhere

Line 15 then asks you to type in a program name which is used in Line 20 to open a file for reading a program Line 18 opens a channel to allow the error message to be read — in case of disaster a mis spelt filename or some other error Lines 500 and 502 do this job

Character conversion

Programs are stored on disc as program files That is a sequential list of characters in ASCII format, with the line numbers and a line 'pointer' to show whether there is another line of program or not

Thus, by knowing what to read and where to read it from it is possible to convert that data into characters and print them on the screen (or the printer by changing the *Print* statements to *Print#* statements and opening a channel to the printer)

Line 25 sets a screen line pointer to be equal to 0, and *Gets* two characters from the disc These two characters are actually part of the program listing as stored on the disc If the second one is equal to zero then there is no more program, and it jumps to Line 999 to finish

Line 30 gets another two characters, and converts them into the program line number in Line 35 Line 37 then gets the next character and if, after conversion, it is equal to zero, this indicates the end of the current program line, so it jumps back to Line 25

Lines 40 and 45 are used to check where we are on the screen (*Peek*(211) returns the current screen position) and then if everything is OK it prints the character read from the disc Line 40 is used for an ordinary character and Line 45 is used if it's a Basic key word as contained in the array *A$* Lines 50 and 55 check again to see where we are on the screen and to see if the last character printed was a colon or a comma If so and it is near the end of a screen line then — for legibility — it goes to Line 65 to print the line number again and moves back to Line 37 for the next character Line 60 just sends the program to Line 37 for another character

Complicated stuff! By reading the previous paragraphs again and hopefully typing in the program and getting it working you should not only gain a good knowledge of how programs are stored in disc but should also learn a fair amount about how to manipulate disc information

Next week we'll start taking a look at the construction of a random access file (and no, we won't be using the program in the Commodore manual!)

FIGURE 2 : PROGRAM LISTER

```
10 DIMA$(90):FDRI=0TD90:READA$(I)
   :NEXT
15 INPUT "PROGRAM FILENAHE ";F1$
18 OPEN 15,8,15
20 DPEN 2,8,2,FI$+",P":GDSUB500:
   GET#2,A$,A$
25 SL=0:GET#2,A$,A$:IFA$=""THEN999
30 GET#2,A$,B$
35 N=ASC(A$+CHR$(0))+ASC(B$+CHR$
   (0))*256:PRINTN: 37 GET#2,A$:
   P=ASC(A$+CHR$(0)):IFP=0THEN
   PRINT:GDTD25
40 IF(PEEK(212)<>0)OR(P<128)THEN
   PRINTCHR$(P);:GDTO
50
45 PRINTA$(P-128):
50 IF(A$=":"ORA$=",")AND(PEEK(211)
   >65)THEN65
55 IFPEEK(211)>75THEN65
60 GDTD37
65 PRINT:PRINTN::SL=SL+1:GOTD37
500 INPUT#15,EN$,EM$,ES$,ET$:
    IFEN$="00"THEN RETURN
502 PRINT"*** DISK ERRDR *** ";EM$
999 CLDSE2:CLDSE15:END
1000 DATA END,FDR,NEXT,DATA,
     INPUT$,INPUT,DIM,READ,LET,GO
     TD,RUN,IF,RESTDRE,GOSUB
1010 DATA RETURN,REM,STOP,DN,WAIT,
     LDAD,SAVE,VERIFY ,DEF,PDKE,
     PRINT$,PRINT,CONT
1020 DATA LIST,CLR,CMD,SYS,OPEN,
     CLDSE,GET,NEW,TAB(,TD,FN,SPC
     (,THEN,NDT,STEP,+,-
1030 DATA*,/,`,AND,DR,>,=,<,BGN,
     INT,ABS,USR,FRE,PDS,SQR,RND,
     LDG,EXP,CDS,SIN
1035 REM FUNNY SQUIGGLE FDR THIRD
     ITEM DF DATA IS THE UP-ARROW
     KEY''
1040 DATA TAN,ATN,PEEK,LEN,STR$,
     VAL,ASC,CHR$,LEFT$,RIGHT$,
     MID$,GO,CONCAT
1050 DATA DOPEN,DCLOSE,RECDRD,
     HEADER,CDLLECT,BACKUP,COPY,
     APPEND,DSAVE,DLDAD
1060 DATA CATALDG,RENAME,SCRATCH,
     DIRECTORY
```

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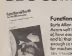
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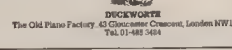
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Dice Game

on Dragon 32

This is a simple game which involves betting on dice

Program notes

150 Initialises variable MH — money held. Reseeds the random number generator using dummy variable MM
160 — 190 Control the action between subroutines
200 Checks that MH is greater than zero and if not goes to the end of game routine otherwise loops back to line 170
200 Program end
250 — 310 Introduction subroutine prints game instructions
560 — 410 Get bet subroutine tells player how much he/she has and asks for money to be bet, and dice total to be bet on. Checks both values are within given ranges
450 — 480 Throw dice subroutine, gives the two dice D(1) & D(2) dice values and then calls the second level subroutine at line 680 to print out these dice
500 — 550 Adjust money subroutine checks whether player has won or lost and informs player. Then adjusts money by either adding or subtracting the amount of the bet.
580 — 680 Game over subroutine. Informs player that the game is over and asks whether the game should be restarted
680 — 730 Print dice subroutine this is a second level subroutine called from the subroutine at line 450

Note Most, if not all *Rem* statements can be deleted the subroutines are numbered after the *Rems* and these are included for clarity only

```
100 '********************************
110 'DRAGON 32    DICE GAME2
120 '(c) IAN 'ebeps' BARCLAY
130 'COPYRIGHT NOVEMBER 1983
140 '********************************
150 MH=100:MM=RND(-TIMER)
160 GOSUB 260:'INSTRUCTIONS
170 GOSUB 350:'GET BET
180 GOSUB 450:'THROW DICE
190 GOSUB 520:'ADJUST MONEY
200 IF MH>0 THEN GOTO 170
210 GOSUB 590:'END OF GAME
220 END
230 '
240 '
250 'intro subroutine
260 CLS:PRINT'***dice game***"
270 PRINT:PRINT'TWO DICE ARE TROWN, AND
YOU BETON THE   TOTAL OF  THESE  DICE.'
:PRINT"IF YOU  ARE  RIGHT, YOU  WIN THEA
MOUNT BET, OTHERWISE  YOU WILLGET THE A
MOUNT OF THE BET TAKENAWAY FROM YOU!!!"
280 PRINT:PRINT YOU MAY BET  ANYTHING  U
PTO YOURCURRENT CASH TOTAL... NO CREDIT!
"
290 PRINT"*PRESS  THE >enter< KEY TO PLA
Y*"
300 IF INKEY$<> CHR$(13) THEN 300
310 RETURN
320 :
330 :
340 'get bet subroutine
350 CLS.PRINT:PRINT:PRINT'YOU HAVE GOT #
";MH
360 PRINT:INPUT "HOW MUCH DO YOU WANT TO
 BET";B
370 IF B<=0 THEN PRINT "MUST BE MORE THA
N ZERO".SOUND 200,2.FOR Z=1 TO 500:NEXT
Z.GOTO 350
380 IF B>MH THEN PRINT 'MUST BE LESS THA
N #";MH:SOUND200,2:FOR Z=1 TO 500:NEXT Z
:GOTO 350
390 PRINT"WHAT NUMBER DO YOU BET ON??":I
NPUT "2 - 12 PLEASE';V
400 IF V>12 OR V<2 THEN GOTO 390
410 RETURN
420 :
430 :
440 'threw dice subroutine
450 D(1)=RND(6):D(2)=RND(6)
460 CLS
470 Q=1:GOSUB 670:Q=Q+1:PRINT:PRINT.GOSU
B 670
480 RETURN
490 :
500
510 'adjust money subroutine
520 DT=D(1)+D(2).PRINT"DICE TOTAL =";DT
530 IF DT=V THEN PRINT 'YOU WIN #";B:MH=
MH+B ELSE PRINT "YOU LOST #",B:MH=MH-B
540 FOR Z=1 TO 900:NEXTZ
550 RETURN
560 .
570 .
580 'game over subroutine
590 CLS:PRINT"***SORRY MATE... YOU'RE BR
OKE***
600 PRINT:PRINT'AND WE DON'T GIVE CREDIT
 HERE!!'
610 PRINT "WOULD YOU LIKE ANOTHER GAME ?
??"
620 PRINT:PRINT:INPUT 'ENTER A YES OR NO
 REPLY";AN$
630 IF AN$<>"YES' AND AN$<>"NO' THEN GOT
O 620
640 IF AN$="NO" THEN RETURN ELSE RUN
650 .
660 .
670 'print dice subroutine
680 IF D(Q)=1 THEN PRINT.SOUND125,3:PRIN
T" * ":PRINT:RETURN
690 IF D(Q)=2 OR D(Q)=3 THEN PRINT '*  '
 ELSE IF D(Q)=4 OR D(Q)=5 THEN PRINT "*
*' ELSE PRINT"***"
700 IF D(Q)=2 OR D(Q)=4 OR D(Q)=6 THEN P
RINT'    " ELSE PRINT " * '
710 IF D(Q)=2 OR D(Q)=3 THEN PRINT "  *'
 ELSE IF D(Q)=4 OR D(Q)=5 THEN PRINT "*
*" ELSE PRINT '***
720 SOUND 125,3
730 RETURN
```

Dice Game
by Ian Barclay

Open Forum

Breakout

on Oric

This version of Breakout follows the normal rules. You must manouvre your bat using the cursor control keys to prevent the ball hitting the bottom wall and direct it to demolish the upper wall. Once you have broken through the upper wall you automatically move on to the next level — with a smaller bat. There are three bat sizes but we have been unable to cope with the smallest. Good luck!

Program notes

Lines 1 — 50	Set up screen and initialise variables
Lines 12 — 15	Decide bat size
Lines 100 — 125	Move the ball
Lines 127 — 128	Plot score
Lines 1000 — 1080	Your movement
Lines 1100 — 1150	Change direction of ball
Lines 2000 — 2035	You broke out routine
Lines 2040 — 2050	You lost routine
Lines 2500 — 2530	New game routine
Lines 2600 — 2680	Define character section

```
0 REM **BREAK OUT .....N.WATSON
  1983**
1 RO=1 SC=0000 PRINTCHR$(6) CHR$
  (20) CHR$(17)
2 CLS GOSUB2600 IFRND(8)>.5THENG=
  1ELSEG=-1
3 PRINT PLOT1,0,#11 PLOT38,0,#
  12 FF=1
4 PLOT5,0,"Score:" PAPER2 INK0
5 PLAY1 0,0,0
6 PRINT"zzzzzzzzzzzzzzzzzzzzz
  zzzzzzzzzzzzz"
7 PLOT2,24,#14 PLOT38,24,#12
10 PRINT"z}}}}}}}}}}}}}}}}}}}}
  }}}}}}}}}}}}z"
12 IFRO=1THENA$="|||" B$="   " CC=50
14 IFRO=2THENA$="||" B$="  " CC=100
15 IFRO=3THENA$="|" B$=" " CC=150
16 PLOT20,0 "Level:" PLOT28
  0 STR$(RO)
20 PRINT"z}}}}}}}}}}}}}}}}}}}}}
  }}}}}}}}}}}z"
30 PRINT"z}}}}}}}}}}}}}}}}}}}}
  }}}}}}}}}}}z"
40 PRINT"z}}}}}}}}}}}}}}}}}}}}
  }}}}}}}}}}z"
50 PRINT"z}}}}}}}}}}}}}}}}}}}}}
  }}}}}}}}}}} z"
55 FOR=7TO24
56 PLOT1,U,"z" PLOT37 U "z"
57 NEXT U
58 PLOT1 25 "zzzzzzzzzzzzzzzzzzz
  zzzzzzzzzzzzzzzzzz"
60 X=17 BP=7 BH=7
61 F=19
62 FORADD=48120 TO 48290STEP40
63 POKE ADD F F=F+1
64 NEXTADD
80 HH=BH PP=BP
100 BP=BP+FF BH=BH+G
102 IFBH>35ORBH<3THENG=-G
    SOUND1,20 7
103 D=SCRN(BH,BP)
105 IFD=125THENSC=SC+CC FF=1
    SOUND1 40,7 PLOT BH,BP+1 32
107 IFD=124THEN1100
108 IFD=122THEN2000
110 IFBP>23THEN2040
120 PLOTHH PP 32
125 PLOTBH BP,"{"
127 SC$=STR$(SC)
128 PLOT10 0,SC$
1000 Q$=KEY$ E=X
1010 IFQ$=""THEN1050
1020 Q=ASC(Q$)
1030 IFQ=9THNA=1
1040 IFQ=8THENA=-1
1050 X=X+A
1055 IFX<2ORX>34+(RO-1)THENX=E
1070 PLOTE,23,B$
1080 PLOTX,23 A$
1090 GOTO80
1100 SOUND1 150,7
1130 IFBH<2THENBH=2
1135 IFBH>35THENBH=35
1140 FF=-1
1145 PLOTHH PP,32
1150 GOTO1000
2000 EXPLODE ZAP ZAP
2001 PLAY0,0 0,0
2010 PRINT PRINT"z YOU BROKE OUT!!"
2020 PRINT PRINT"z YOUR SCORE
     WAS " SC$
2030 IFRO<3THENRO=RO+1 WAIT300
     SC=SC+200 CLS GOTO3
2035 GOTO2500
2040 PRINT PRINT"z YOU DID NOT
     BREAK OUT!!"
2041 PLAY0 0,0,0
2045 PRINT PRINT"z YOUR SCORE
     WAS " SC$
2050 GOTO2500
2500 PRINT PRINT"z ANOTHER GAME
     (Y N)"
2505 GETAD$
2510 IFAD$<>"y"ANDAD$<>"n"THEN2505
2515 PRINTCHR$(20),CHR$(6) CHR$(17)
2520 IFAD$="y"THENRUN
2530 END
2600 FORADD=47056 TO 47097
2610 READ CT
2620 POKE ADD,CT
2630 NEXT ADD
2635 DATA#FF,#FF #FF,#FF #FF,#FF
     #FF,#FF
2640 DATA#00,#00 #0C #1A,#16,#0C,0 0
2650 DATA0 0 #3F,#3F,#23,#32,0,0
2660 DATA0,#3F 9 9,#3F,#24 #24 #3F
2670 DATA#FF #FF,#FF #FF,#FF #FF,
     #FF,#FF
2680 RETURN
```

Breakout
by Neil Watson

4 Stroke

on Spectrum

This program is designed to show the basics of how a four stroke petrol engine works. The program works on a Vic 20 with super expander cartridge. The program draws an engine in high res and then animates it showing the four strokes inlet, compression, spark, and exhaust.

The program will continue running until run stop is pressed.

```
300 FORR=1TO150 NEXT
309 COLOR0,0,5,0
310 FOR I=M TO 1.56 STEP -.2
317 D=0 GOSUB 600 PI=PI+8
320 W=X+RA*COS(I)
325 Z=Y+RA*SIN(I)
340 D=2 GOSUB 600 -
342 NEXT I
345 CHAR10,11,"        "
350 REM ** EXHAUST **
352 REM
360 D=0 GOSUB 500
362 IN=0 OT=1 D=2 M=I N=0
365 GOSUB 500
366 REGION 4
370 CHAR10,11,"EXHAUST"
371 REGION 5
372 FOR I=MTO N STEP -.2
374 D=0 GOSUB 600 PI=PI-8
375 W=X+RA*COS(I)
377 Z=Y+RA*SIN(I)
380 D=2 GOSUB 600
382 NEXT I
385 IF N=0 THEN M=6.2 N=4.60 GOTO 372
390 CHAR10,11,"        "
392 D=0 GOSUB 600
395 GOTO 200
500 REM ** VALVES **
505 REM
510 IF IN=0THEN DRAW D,330,270TO330,350 DRAWD,315,350TO345,350 GOTO 520
513 CHAR6,3,"IN>"
515 DRAW D,330,290TO330,370 DRAW D,315,370TO345,370
520 IF OT=0THEN DRAW D,460,270TO460,350 DRAW D,445,350TO470,350 GOTO 530
525 DRAW D,460,290TO460,370 DRAW D,445,370TO470,370
527 CHAR6,10,">OUT"
530 IF D=0 THEN CHAR6,3,"    " CHAR6,10,"    "
540 RETURN
600 REM ** PISTON **
610 DRAW D,310,400+PITO475,400+PI
615 DRAW D,310,500+PITO475,500+PI
620 DRAW D,400,500+PI TO W,Z TO X,Y
649 RETURN
900 REM ** INSTRUCTIONS **
910 PRINT"   4 STROKE PETROL"
915 PRINT"        ENGINE"
917 PRINT"     ______________"
920 PRINT" THIS PROGRAM SHOWS   HOW A FOUR STROKE"
925 PRINT"PETROL ENGINE WORKS."
930 PRINT"THE PROGRAM SHOWS THE FOUR BASIC STROKES -"
932 PRINT"   INLET,"
934 PRINT"   COMPRESION,"
936 PRINT"   SPARK AND"
938 PRINT"   EXHAUST."
950 PRINT"   PRESS ANY KEY"
995 GETA$ IFA$=""THEN995
999 RETURN
```

4 Stroke
by A Blackham

Sub Strike

on Vic 20

Your mission as sub-commander is to wipe out all the alien nasties which lurk beneath the waves. The aliens come in two types and will try to destroy you by ramming you. When you fire a small torpedo will shoot across the screen from your position at the far left of the screen to the far right-hand side. The aliens advance towards you from left to right and when one is hit it will resume the attack from the right. Once an alien reaches the left of screen it will home in on you moving straight up or down.

The only way you can dodge an alien when it is doing this is to move forward. Once all the aliens reach this position they will begin again from the right and another alien will join them. There are three aliens at the beginning of the game and once they have passed you it is almost impossible to keep them all back when they reappear. There is an on screen score and you score 100 points per alien.

The game begins with the title, escorted by two aliens scrolling into the centre of the screen above the sea. The game needs very few changes to be turned into a space game ie screen colour, player's ship.

Keys are as follows

I —UP
Q —DOWN
0 —FIRE
O —FORWARD (O—Letter — 2nd row)

Note that if you move forward and then release the "O" key you will slip back to the edge of the screen.

Program notes

40	Graphics FGH
1000	Graphic E x 3
2000	Graphic E
210	Graphic I
7000	Graphic Cs and there are 3 spaces in the middle
7050	Graphic C
6-38	Screen and variables
40-160	Main game loop
200-220	Fire torpedo
1000-1040	Destroy sub. End game
2000-2030	User def characters
5000-6040	Alien hit
7000	Title scroll

```
  5 GO SUB 5000
  6 BORDER 5
 10 PAPER 5  CLS
 20 FOR g=1 TO 5  PRINT INK 0;
[redacted]
: NEXT g
 30 GO SUB 7000
 33 LET m=3  LET -=-  LET  =0.
LET s=0
 35 DIM d(m)  DIM f(m)  DIM h(m
)  FOR g=1 TO m  LET f(g)=INT (R
ND*15)+6  LET h(g)=31-(INT (RND*
10))  LET d(G)=146
 37 IF RND>.7 THEN LET d(g)=153
 38 NEXT g
 40 PRINT AT p,k, INK 0, FGH
 50 FOR g=1 TO m  IF h(g)<=31 T
HEN PRINT INK 1,AT f(g),h(g);CHR
$ d(g)
 60 IF f(g)=p AND h(g)>=k AND h
(g)<=k+2 THEN GO TO 1000
 70 NEXT g
 80 IF INKEY$="0" THEN GO SUB 2
00
 90 FOR g=1 TO m  PRINT AT f(g)
,h(g);" "  LET f(g)=f(g)+INT (RN
D*3)-1  LET h(g)=h(g)-1. LET f(g
)=f(g)+(f(g)<6)-(f(g)>21)
 95 IF h(g)<=2 THEN LET h(g)=1
 LET f(g)=f(g)+(p>f(g))-(p<f(g))
 100 NEXT g
 105 FOR g=1 TO m
 106 IF h(g)>=3 THEN GO TO 110
 107 NEXT g
 108 LET m=m+1  GO TO 35
 110 IF INKEY$="" THEN LET k=k-(
k>0)  PRINT AT p,k+3," "  GO TO
40
 120 PRINT AT p,k."   "
 130 LET p=p+(INKEY$="q")-(INKEY
$="1"): LET p=p+(p<6)-(p)21)
 140 IF INKEY$="o" THEN LET k=k
-(k>0)
 150 IF INKEY$="o" THEN LET k=k+
(k<20)
 160 GO TO 40
 200 FOR g=k+4 TO 31  IF ATTR (p
,g)=41 THEN GO TO 2000
 210 PRINT AT p.g,"I",AT p,g-1,"
"  NEXT g
 215 PRINT AT p.31," "
 220 RETURN
 225 IF RND>.5 THEN LET d(g)=147
1000 PRINT AT p.k,"EEE"  BEEP .0
1,-5  BEEP .01.-15  BEEP .01,-5.
 BEEP .01,-15
1010 FOR g=50 TO 60  BEEP .005,g
  NEXT g
1020 PRINT AT 10,10, FLASH 1, IN
K 7, PAPER 1,"Game Over",AT 13,0
,"Score   ",s
2000 PRINT AT p.g. E   FOR u=50
TO 65  BEEP .005,u  NEXT U. LET
s=s+100
2010 PRINT PAPER 5, INK 0,AT 0,0
,"SCORE  ",s
2020 PRINT AT p,g-1,"  "
2022 FOR q=1 TO m  IF p=f(q) AND
 g=h(q) THEN GO TO 2024
2023 NEXT q
2024 LET h(q)=31. LET f(q)=INT (
RND*15)+6  LET d(q)=146
2025 IF RND>.5 THEN LET d(q)=153
2030 GO TO 90
5000 FOR u=0 TO 7  READ i  POKE
USR "c"+u,i  NEXT u
5010 DATA 66,36,60,189,255,60,90
,66
5020 FOR u=0 TO 7  READ i  POKE
USR "f"+u,i  NEXT u
5030 DATA 0,0,16,240,192,08,2,3
5040 FOR u=0 TO 7  READ i  POKE
USR "g"+u,i  NEXT u
5050 DATA 15,15.255,0,0,0,0,255
5060 FOR u=0 TO 7  READ i  POKE
USR "h"+u,i  NEXT u
5070 DATA 128,128,205,1,2,12,48,
192
5080 FOR u=0 TO 7  READ i  POKE
USR "i"+u,i  NEXT u
5090 DATA 0,0.0,0,0,95,0,0
6000 FOR u=0 TO 7  READ i  POKE
USR "j"+u,i. NEXT u
6010 DATA 60,66,66,60,90,153,165
,165
6020 FOR u=0 TO 7  READ i  POKE
USR "e"+u,i  NEXT u
6030 DATA 128,71,184,240,28,31,2
34,9
6040 RETURN
7000 LET a$="C SUB   STRIKE C"
7010 FOR g=31 TO 16 STEP -1
7015 BEEP .01,RND*50
7020 PRINT INK 1, PAPER 6,AT 2,g
,a$( TO 1+31-g)  NEXT g
7030 FOR g=15 TO 8 STEP -1  PRIN
T INK 1, PAPER 6,AT 2,g,a$," "
7035 BEEP .01,RND*50
7040 NEXT g
7050 FOR g=30 TO 13 STEP -1. PRI
NT INK 1  PAPER 6,AT 4,g; C ,"
7055 BEEP .001,RND*50
7060 NEXT g
7070 RETURN
1030 PRINT AT 15,5 "Press any ke
y to play"  IF INKEY$="" THEN G
O TO 1030
1040 RUN
```

Sub Strike

Open Forum

Graphics

on Memotech

This is simple program to demonstrate the excellent graphics facilities on the Memotech Mtx computers.

Program notes

Line 20	Switch on full graphic screen and colour change
Line 25	Main loop
Line 40	Graph values
Line 50	Loop to draw
Line 60	Ink colour
Line 100	Like Sinclair *Print At*
Line 110	Stop screen clear
Line 1000	Instant screen recall

For Cosine Graph.

Change line 30 to

30 Let B = 1 If I>64 and I<192 *then let* B 1

Make Sin in line 40 Cos. After running the program type *Goto 1000*

```
L.
  10 LET B=1
  20 VS 4:FAPER 1:COLOUR 4,1:CLS
  30 IF I.127 THEN LET B=-1
  40 LET A=BB+BO*SIN (I/128*FI)
  50 FOR S=BB TO A STEF B
  60 INK INT (RND*15)+1
  70 PLOT I,S
  80 NEXT S
  90 NEXT I
 100 CSR 15,0:PRINT "OK"
 110 BOTO 110
1000 VS 4:BOTO 1000
  25 FOR I = 0 TO 255
```

Graphics
by Martin Jayce

Microradio

GW6JJN

Wishful thinking?

A month or so ago I spoke about packet radio, albeit rather briefly and many of you wanted to know more. The concept of packet radio is new in the sense that transmissions are in binary. Of course it could be said that morse code is a 'binary' transmission and in a sense it is. Because the message is in dots and dashes, morse will succeed where voice fails.

Imagine the advantages of morse but, instead of sending letters of the alphabet, we could send encoded voice and pictures as well as computer programs and data. Not at 12 words per minute but at 2400 bits per second.

Anyone who has seen or used a time shared computer system will know that the computer is incredibly fast and the user extremely slow by comparison. If each user were connected by radio link to a computer, then in order to allow multi-user capability the computer has only to check each link occasionally and divide processing time between users. For example, it might take you 30 seconds to type in a line of type, but only a few milliseconds for the computer to process that information. It appears to the user that he has the computer all to himself.

Think then of the radio link itself. The line that took you 30 seconds to type might have 64 eight bit ASCII characters, or 512 bits of information — that is an average rate of 512 divided by 30, or about 17 bits per second. It's pretty simple to send 2400 bits per second through a voice channel. So if we were able to store each piece of information locally and then send it in a short burst, it could be sent in about 0.2 secs or a fifth of a second. This means that, with suitable protocols, several hundred amateurs could be accomodated on the same voice channel, each thinking that he had the channel to himself. The possibilities are enormous, crowded bands would be a thing of the past.

The short burst already mentioned is a packet. It would contain, in addition to the data, identification of sender and receiving station and an error checking system to know that the packet is correct (if not it would be sent again automatically). Instead of a central computer, each station would use a home computer programmed with the protocols and interfaced to the transceiver. If these packets were then sent via a suitably intelligent computer controlled node in a repeater or satellite, then the possibilities are endless and very exciting.

Each node could be set up in the way repeaters are set up, with a group to run it. The facilities it could offer as well as relaying packets are bulletin boards, utility programs to download, or even the possibility of a multi-user adventure game. Now there's an idea to keep you awake at night, rag-chewing will never be the same again.

Is all this wishful thinking and science fiction? — No, it's packet radio and it's available now.

Ray Berry GW6JJN

This series of articles is designed for radio and microcomputer enthusiasts alike. If you have any queries that you want answered, hints and tips to share or topics that you would like to see covered, write to Ray Berry, Microradio, *Popular Computing Weekly*, 12-13 Little Newport Street, London WC2R 3LD.



A new product from Melbourne House is like *Sherlock* still in preparation" though in a more advanced state and likely to be with us in the next couple of weeks It is another book and one that will be of great interest in particular to many of the readers of the Adventure Corner — and incidentally make a large part of my job easier!

David Elkan has written *A Guide to playing The Hobbit* a book that I never thought Melbourne House would be eager to see the light of day But apparently Fred Milgrem who runs the company, forgot his misgivings when he saw the manuscript Although the book does indeed present a solution it by no means gives away the whole game

To carry on with the subject of new releases, and competitions Carnell Software s next program *The Wrath of Magra*, is nearing completion and will be launched with a competition Carnell tell me that £5000 of prizes will be on offer, including 20 (count em!) colour TVs, and four or five big computers

While at the Heathrow trade show a couple of weeks ago I was unexpectedly introduced to Scott Adams His adventures have just recently as you ll know been converted to run on the BBC and Spectrum computers — Adams says that he admires both machines and intends to write more programs for them His company Adventure International has joined up with Marvel Comics to bring us adventures featuring many of the favourite heroes like *Captain Marvel* the *Hulk* and *Spiderman* Apparently the player will take on the personality of the hero in question and his attributes

Says Mike Woodroffe Adventure International UK s Managing Director Marvel will produce a comic to go with each game The storyline is left at a certain point, and you have to go on to the tape to complete the adventure The programs will all feature high-resolution graphics The projected release date of the first in the series, *The Hulk*, is May but only a couple of pictures were on view at the show so I think it is a rather optimistic forecast However if you are a Spectrum, Atari, Commodore BBC or Oric owner and you want to leap buildings at a single bound (or even two), and run up a large clothing bill, you won t mind waiting will you?

Ian Hislop deputy editor of *Private Eye*, making a foray into the rather more sedate world of *The Listener* managed to aim a sideswipe at the world of computers in general and adventures in particular After describing the computer profession as "men with beards wearing *Camra* sweat-shirts and training shoes" — I have been known to grow tired and emotional in the company of the *Camra*-clad but I haven t an item of their clothing although I do, I admit have a fondness for training shoes — he goes on to say A radio producer once confided in me that he had found it almost impossible to find anyone interesting in the whole industry

Note *almost* impossible — he obviously couldn t bring himself to condemn the whole industry , after all he may one day be after one of the afflicted for a job! But maybe he was talking of the broadcasting industry — have you met an interesting radio producer lately? They are probably the most out-of touch out-of-date bunch to be found outside of Fleet Street.

Hislop continues (warming to his subject of adventures) I always feel Trolls must be the point of contact for the computer world, being squat bearded men who never see the light of day and who toil underground " Ah, we re back to radio producers!

All this witty comment is from a man who later in his column goes on to attack those " critics (who) so often adopt a contrary pose for effect " Hurriedly he defends his own position "My computer-phobia is genuine, though it looks like a pose Excuse me, I think I d better dive back down to my underground cavern and carry on shining my training-shoes — I ve just thought of an excellent use for them

Talking of books (well I was some time ago!) I ve had several letters from people who have read my own modest contribution to the literary world Many of them I force myself to say have had nice things to say about it — Thank you very much! Others however have been cries for help in typing in the program This is representative

"Would you please send me a list of bugs printed in the first edition of *Spectrum Adventures* I can t find all of them and your program still won't run I have made no mistakes in typing it in and I ve checked and re-checked" P Wilson Lancaster

I have had the same sort of plea from several people — unfortunately they are all stuck in different places some a lot further on than others However, many more people have written to say how much they have enjoyed playing the game!

The listing in the book was taken directly from the master tape of our program (which incidentally has been the subject of a recent special offer from *PCW*) So, if you are having trouble with the listing make absolutely sure that you have typed every comma and semi-colon The slightest difference may be catastrophic If you are absolutely sure that you have done everything correctly and then still experience trouble it may be that you are getting a "glitch" or power surge through the mains when typing in the program This can sometimes corrupt the program while the listing looks fine If this has happened to you there is nothing else to do but track down the offending line and keep re typing until the program works — and believe me as listed it does!

This series of articles is designed for novice and experienced Adventurers alike Each week Tony Bridger will be looking at different Adventures and advising you on some of the problems and pitfalls you can expect to encounter So if you have an Adventure you want reviewed or if you are stuck in an Adventure and cannot progress any further write to Tony Bridge Adventure Corner, *Popular Computing Weekly* 12-13 Little Newport Street, London WC2R 3LD

Peek & Poke



JOYSTICK LINK

Eurrie Eajadhur of Balham Park Road Balham London writes

Q I would like to know if there is a joystick available for the *RML Link 480Z*?

A As far as I know there is no joystick available for the Link RML 480Z. I do not have a 480z to hand, however the port is an analogue output. You need something along the lines of a variable resistor with the wiper line wired to each of the joystick pins. This will help you to read the potentiometers that give the analogue outputs. The two push buttons need to be wired to the Ov line and the resistor.

GRINDING TO A HALT

C A Boyce of Grand Avenue Lancing West Sussex writes

Q I have a 48k Spectrum for a year but my use of it is grinding to a halt for lack of information. The user manual is pretty awful. In particular I want to find out how to use the port. I wrote to Sinclair but they just answer that there are books about. Can you suggest one book that will give me instructions of how to get at the port.

A I get letters from time to time from Spectrum owners that are less than complimentary about the user manual. I see quite a few manuals and in fact the Spectrum one is one of the best.

I do agree that information directly relating to the port is quite scarce. However *Delving Deeper into your ZX Spectrum* by Dilwyn Jones has several pages of useful information and routines to demonstrate various aspects of the ports in action.

ANNOYING HABIT

Robert Nunn of Palm Road, Romford Essex writes

Q I have just purchased the Currah' Micro Speech System and would like to know if there is a cure for a very annoying habit it has. It crashes programs after a minute or two. I also have difficulty in *Loading* games that are compatible, such as *Atic Atac* and *Lunar Jetman*

A The Currah is an excellent speech unit, but apart from the fact it has no expansion port and is thus a dead end device, it has a second disadvantage in that it cannot automatically be used with any program. This is because the unit needs 256 bytes for its own use. So it lowers *Ramtop* to give it the space. Unfortunately a lot of commercial programs do the same.

This is the source of the problems in both the unit and the program can often end up trying to use the same space. Some programs have been adapted to overcome this, however they must be marked as compatible. Games such as *Atic Atac* were initially written before the advent of the Currah unit, and as such had no provision for it. If you have one of these earlier versions then I am afraid that you will have trouble using them in conjunction with the Speech unit.

SPECTRUM SOUND

David Muir of Ailsa Road, Saltcoats Ayeshire writes

Q I have built a programmable sound Generator for my Spectrum. After a few attempts I realised that I did not know how to connect my Spectrum edge connector to the 8 pins 7-14 on the AY-3-8912 sound chip. Can you help — do you know which lines on the Spectrum edge connector go to these pins?

A I am wondering whether or not you have slightly confused the AY-3-8910 and AY-3-8912. Nevertheless this should not matter as in this case the control is the same as far as pins 7-14 are concerned.

Pins 7-14 are an I/O port and in fact they do not have to be connected directly to the Spectrum, as the computer is buffered via the soundchip. The ports on the chip you will have to find are the Register change port and the data ports. It is through these that the I/O is controlled.

Whether the port is acting as an Input or Output port depends on bit 6 in register 7. If this bit is 0, then the port will be used for Input. If the bit is one then the port will be used for Output. You control this by *Poke*-ing the appropriate value into the Register change port. The data that comes to or goes from this port via Register 15. So to output from the port, the data port and register port will have to be set to put the necessary data into this register.

DULL AND LACKING

Robert Dempster of Cockerhill Road Cokerhill, Glasgow Scotland writes

Q Please could you inform me of any established software for the Aquarious — I have found most of the usual software for this computer dull and lacking in the addictive quality common to most Spectrum tapes

A The vast amount of software available for the Sinclair computers reflects the success of the machine. Any new computer whose initial sales are not large, cannot expect to attract many software houses to write for it.

I would have to see the amount of software increasing a little in bold quantity, and hopefully quality. One help would be a machine code monitor for the machine to enable people to write machine code more easily.

AN OBVIOUS CHOICE

Stewart Murray of Troon, Ayrshire writes

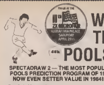
Q Is there anyow a version of *Fortran* for the Spectrum? If so do you know where I can get it and how much it will cost? *S. Lawrence of Victoria Road, Newport, Isle of Wight*, also asks: I have 48k Spectrum and wish to use *PASCAL* on it. Are there any programs on the market which will enable me to do this? and finally *Mr A Ibrahim of Longsight, Manchester writes* I have recently bought a Forth Compilier for my Spectrum and am very impressed with the speed and compact structure. Do you think that Forth is a good language to write arcade games in. Also do you know the address of the *Forth* Interest Group.

A While sooner or later I suppose I expect to see everything including a kitchen sink available for the Spectrum at the moment it is not, and nor is *Fortran* to my knowledge. In all honesty it isn't an obvious choice for a language on the Spectrum.

Pascal is slightly better served. Hi-Soft do a *Pascal* compiler for the Spectrum. They can be contacted at 13 Gooseacre Cheddington Leighton Buzzard.

As for the *Forth* Interest Group, well this is a language that has been tipped as being likely to replace *Basic*, highly debatable but, nevertheless it deserves its success. The Forth Interest Group are to be found at Bradden Old Rectory, Towcester Northants. Contact K Goldie-Morrison.

Is there anything about your computer you don't understand, and which everyone else seems to take for granted? Whatever your problem *Peek* it to Ian Beardsmore and every week he will *Poke* back as many answers as he can. The address is *Peek & Poke*, *PCW*, 12-13 Little Newport Street, London WC2R 3LD.


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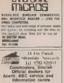
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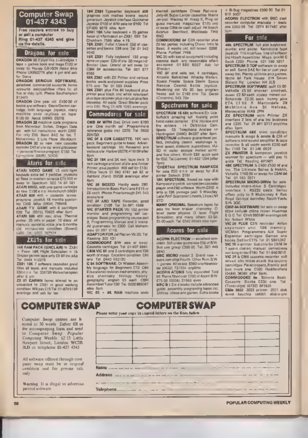
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CASIO FX602P Any offers under £25 please send to Paul Silverman 181 Adelaide Road London NW3 3NL.

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ADVENTURE HELPLINE

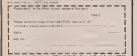
Micro *Spectrum 48K*
Adventure *The Knight's Quest*
Problem *Please can you tell me how to escape from the elves camp also how do I kill the elves?*
Name *John Sparrow*
Address: *28 The Firs Daventry, Northants NN11 5PX*

Micro. *ZX Spectrum 16K*
Adventure *Adventure A — Planet of Death*
Problem. *Please tell me how to get out of the Maze?*
Name *Trevor Watson*
Address *6 The Cote, Farsley Pudsey W Yorks, LS28 5DU*

Micro *ZX Spectrum (48K)*
Adventure *Valhalla*
Problem *I can't find the treasures Could you also tell me the best Dungeons and Dragons adventure*
Name *Graeme Lennox*
Address *27 Lyndhurst Road, Hampstead, London NW3*

Micro. *Spectrum*
Adventure: *Valhalla*
Problem *I can find Ofnir and Drapnir I can't get any further I thought Drapnir would open a new ring road*
Name *Mr J W Rundle*
Address: *26 Western Road Aldershot Hants GU11 3PL*

Micro *ZX81*
Adventure *Inca Curse*
Problem *Can not get in temple door*
Name. *Graham Heslop*
Address. *3 Hulbard Close, Old Trafford Manchester 16*



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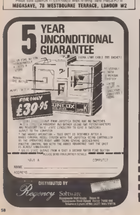
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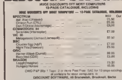
67 Peascroft Rd, Hemel Hempstead Herts HP3 8ER
Tel 0442 51809



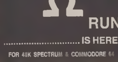



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FOR 48K SPECTRUM & COMMODORE 64

New Releases

MONEY MAKER

If I Had a Million is the latest in Phoenix Softwares Arcade/Adventure packages where you must do well enough at the first to ever be able to start on the second

This one is actually a departure from their tradition of one machine code arcade game and one adventure

In Part 1 the action involves two or more people playing a sort of computer equivalent of monopoly — you have to buy and sell properties and flirt with the stock market

If you manage to win over £20,000 at this point you will be given the start code for Part 2 which is basically a financial simulation game where you must invest in property and shares Both games are fun and I thought the financial simulation was one of the best such games I have played

Program	*If I had a Million*
Price	*£9 95*
Micro	*Dragon*
Supplier	*Phoenix Software Spangles House 116 Marsh Road Pinner Middlesex*

GOLD MEDAL

Latest in the continuing adventures of the Piman is *Olympimania* in which our hero gets to try his hand at a number of sports

Actually, with the exception of swimming it turns out that the Piman's various approaches to the different sports are surprisingly similar — somehow they are all reduced to running and jumping over obstacles After each stage the eager Piman is greeted by cheering crowds

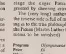
The (very long) anthem on the reverse side is full of meaning as to the true philosophy of the Piman (Martin Luther King seems to be involved)

Program	*Olympimania*
Price	*£6*
Micro	*Spectrum*
Supplier	*Automata 27 Highland Road Portsmouth Hants*

CITY STREETS

Hewson Consultants had a minor hit with *3D Seiddab Attack* on the Spectrum and so they can hardly be blamed for bringing it out on the Dragon as well

The game involves patrolling the latticed streets of a city trying to rid it of various kinds of unpleasant alien. The strength of the title lies in the realistic perspectives



The screen is split into the view from the cockpit showing the city and a radar scope showing the positions of the various aliens

Given the poor reputation the Dragon has for graphics this version of the game is surprisingly close to the original — proving once more that poor programs often are the result of bad programming

Program	*3D Seiddab Attack*
Price	*£7 95*
Micro	*Dragon 32*
Supplier	*Hewson Consultants 56B Milton Trading Estate Milton Abingdon Oxon OX14 4RX*

FAST RUN

Until recently if you wanted to compile a Commodore 64 program you had to rely on *Petspeed* which although effective is pretty expensive

An alternative comes from C P White whose *Basic Compiler 64* offers many of the same features as *Petspeed* but apparantly runs faster, and costs £34 50

Using the program, most Basic programs can be speeded up sixty times — there are a number of small limitations as to when the program can be used

The thing about the Commodore 64 is that it is easy, using the graphics and sound hardware, to write programs that look professional — it has always been the run time that has let them down C P White is asking for no more than a mention on any commercial program that has used its compiler, which seems reasonable

Program	*Compiler 64*
Price	*£34 50*
Micro	*Commodore 64*
Supplier	*C P White (Services) 54 Northfield Avenue West Ealing London W13 1RR*

Pick of the week

GARBAGE IN, GARBAGE OUT

New Generation used to have a reputation for technically brilliant but not necessarily very playable games It was as though the energy that went into one element left little spare for the other

With its latest release *Trashman* though both aspects are perfectly balanced Not only does the game look good but it's very compulsive as well

The idea of the game is to collect the bins from an everyday suburban street — beautifully illustrated in high-res detail and complete with greenhouses and estate cars (you can imagine everyone inside the houses eating their muesli and drinking their Pina Coladas whilst watching Channel 4)

The Bin Man must collect the dustbins one by one, taking them to the refuse cart which is slowly moving up the road and then return them to the houses Doing this without treading on the grass will, more often than not, result in the owner of the house appearing at the door and offering the bin man a tip for various services (some slightly suspect morally)

Tips (financial incentives not rubbish tips) are useful because they prop up the bonus time which is constantly ticking away Fail to empty the requisite number of bins in time and you are fired Getting the bins often involves crossing a busy road — shades of *Frogger* as you avoid the traffic Walking on the grass not only loses you your tip it also unleashes a ferocious dog that snaps at your heels — if you get bitten you'll walk with a limp so losing more time

Later levels have more bins, more traffic and, occasional pubs in which you can drink and gain more points Drink too much and the binman becomes almost impossible to control lurching from side to side

Technically the game is superb with smooth scrolling and movement My only quibble is the slightly juvenile nature of some of the ha ha comments which appear at the bottom of the screen

Other than that it's wonderful

Program	*Trashman*
Price	*£5 95*
Micro	*Spectrum*
Supplier	*New Generation 16 Brendon Close Oldland Common Bristol BS15 4QE*

CREATIONS

Screenplay is a new company, partly owned by Dave Patterson ex-partner in Silversoft Its first release is an *Animator* program for the BBC — soon to be followed by one for the Dragon

The program is actually a sprite designer although with a number of additional features The size and number of sprites you can have are interdependent — with a standard 8 x 8 layout you can have 63

The sprites can have all 16 logical colours A collision checking routine is built into the system and full error reports are also provided

There are essentially two sections to the package The first enables you to design the shapes and is called *Creator* The second turns the designs into machine code information that can be loaded into your own programs (Basic or machine code) — the *Compiler*

The instructions are fairly simple and there is a demo program written in Basic which illustrates the impressive results you can achieve

Program *Animator*
Price *£11 95*
Micro *BBC B*
Supplier *Screenplay*
134 St Vincent Street
Glasgow G2 5JU

SNAKING

Cobra is the first independently released program for the Memotech MTX machine It is surprising that there haven't been more programs released for this machine — its graphic and sound possibilities are good and I didn t think it had sold *that* badly either

It isn't the most original game you'll ever see, in fact it's a version of *Snake* where you move the cobra around the screen eating various kinds of fruit whilst avoiding walls and rocks Each item you eat makes the cobra longer so the chance of it bashing into something becomes so much the greater

Not a masterpiece, but an independent MTX software company has to be good news for owners of the machine

Program *Cobra*
Price *£6 50*
Micro *Memotech MTX*
Supplier *Xas larsone Software*
Midsomer
Bath
Avon BA3 2DL

INSTRUCTIVE

100 Programs for the ZX Spectrum costs £10 from this slim evidence we can deduce one major thing — the programs are not going to be very wonderful

On the other hand this doesn't mean they will be completely useless Of the programs featured here a fairly high proportion are either reasonably entertaining or reasonably instructive

Programs range from games like *Mastermind* and *Tennis* utilities like *Travel costs* and *Pie chart* to mathematics programs like *Vectors* and *Polynomial multiplication* A booklet comes with the package and explains the main features of each program. Probably a good buy for the new Spectrum owner just wanting a good idea of the kind of things his or her machine can do

Program *100 Programs For The Spectrum*
Price *£10 00*
Micro *Spectrum*
Supplier *Prentice/Hall*
66 Wood Lane End
Hemel Hempstead
Herts HP2 4RG

STUNNING

Blade Alley is a version of the *Buck Rogers* arcade game for the Spectrum More precisely it's a superb version of the arcade game

Describing the game is likely to reduce it to the banality of most other programs, you control a fighter — you must avoid and shoot at various different aliens

That said, the graphics are stunning, using some clever techniques to give the impression of hurtling through space in three dimensions The spinning and bouncing aliens seem to come from the far distance and grow threateningly as you rush towards them Like *Zaxx on* your spaceship leaves a shadow on the alien landscape, adding to the illusion

Arcade action for SPECTRUM 48K

There are six different screens of action and the game will work with both Kempston joysticks and Currah microspeech although not, if they think about it, at the same time

Program *Blade Alley*
Price *£5 95*
Micro *Spectrum 48K*
Supplier *PSS*
452 Stoney Stanton Road
Coventry
CV6 5DG

WORD PLAY

With the launch of the Atmos complete with proper keyboard it s likely we'll see a lot more serious software, in the first instance — since they have access to the technical information — from Tansoft

Author is a word processor for both the Atmos and the 48K Oric Although it is one of the first I have seen for the Oric it looks excellent The main reason for this being not so much the range of facilities and ease of use, as the way it can be readily altered to work with a wide range of popular printers, sending control codes, etc , without any problems

The manual is full and clear without being excessively complex and the whole package is to be recommended

Program *Author*
Price *£14 95*
Micro *Oric/Atmos*
Supplier *Tansoft*
Units 1 & 2
Cambridge
Techno Park
Newmarket Road
Cambridge CB5 8PB

DES. RES.

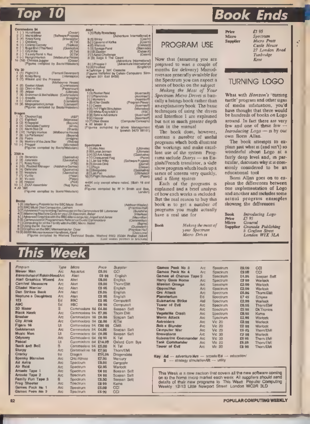
What games there are still being released for the ZX81 are tending to feature high-resolution graphics making them, apart from colour, visually very similar to some of the simpler Spectrum games

You can now get a program to help you use high resolution in your own ZX81 games — Odyssey Computing's *High Resolution Graphics* is not the first such package but it is one of the most straightforward to use

Other than 16K the standard ZX81 is all that is required the new high-res commands held in *Rem* statements within standard Basic

Program *High Resolution Graphics*
Price *£5.95*
Micro *ZX81 (16K)*
Supplier *Odyssey Computing*
28 Bingham Road
Sherwood
Nottingham

New Releases is designed to let people know what software is coming on to the market. If you have a new game or utility which you are about to release send a copy and accompanying details to New Releases Popular Computing Weekly, 12-13 Little Newport Street, WC2R 3LD



Top 10

Commodore 64

1	( )	Hunchback	(Ocean)
2	(1)	Manic Miner	(Software Projects)
3	(4)	Krazy Kong	(Interceptor)
4	( )	Odyssey	(K Tel)
5	(–)	Colossic Cavern	(Taskset)
6	( )	Bugs Boo (The Flea)	(Quicksilva)
7	(–)	City Attac	(K Tel)
8	( )	It's only Rock n Roll	(K Tel)
9	(–)	Hungry Horace	(Melbourne House)
10	(10)	Chinese Juggler	(Ocean)

(Figures compiled by Boots/Websters)

Vic 20

1	(1)	Flight 015	(Ferranti Davenport)
2	(2)	Krazy Kong	(Interceptor)
3	(7)	Wizard and the Princess	(Melbourne House)
4	(8)	Gasket Attack	(Commodore)
5	(3)	Choc-a-Bloc	(Paramount)
6	(5)	Jetpac	(Ultimate)
7	(9)	Snowman & Maths Maze	(Commodore)
8	(–)	Arcadia	(Imagine)
9	(–)	Gridrunner	(Llamasoft)
10	(6)	Megagalactic Llamas	(Llamasoft)

(Figures compiled by Boots/Websters)

Dragon

1	(1)	Chuckie Egg	(A&F)
2	(7)	Eightball	(Microdeal)
3	(2)	Kriegspiel	(Beyond)
4	(4)	Chocolate Factory	(Mrs Mills)
5	(3)	North Sea Oil	(Shards)
6	(10)	Hungry Horace	(Melbourne House)
7	(8)	Up Periscope!	(Beyond)
8	(5)	Pedro	(Imagine)
9	(6)	Mystery of the Java Star	(Shards)
10	(–)	Frogger	(Microdeal)

(Figures compiled by Boots/Websters)

ZX81★

1	(3)	Scramble	(Quicksilva)
2	(2)	Asteroids	(Quicksilva)
3	(1)	Krazy Kong	(PSS)
4	(10)	Football Manager	(Addictive Games)
5	(4)	Defender	(Quicksilva)
6	(5)	Invaders	(Quicksilva)
7	(7)	Vu-file	(Psion)
8	(8)	Vu-calc	(Psion)
9	(8)	Hopper	(PSS)
10	(–)	ZXAF Assembler	(Bug Byte)

★ All 16K

(Figures compiled by Boots/Websters)

Atari

1	(1)	Rally Speedway	(Adventure International)★
2	(5)	Blinky	(Cosmi)
3	( )	Caverns of Kafka	(Cosmi)
4	(6)	Warlock	(Calisto)‡
5	(3)	Savage Pond	(Starcade)
6	(10)	Zaxxon	(Datasoft)
7	( )	Aztec Challenge	(Cosmi)
8	(8)	Saga 6 The Count	(Adventure International)
9	( )	Preppie II	(Adventure International)
10	(9)	Firefleet	(English)‡

★Cartridge ‡ 32K Cassette

(Figures compiled by Calisto Computers Birmingham 021 632 6458)

BBC★

1	(3)	Rocket Raid	(Acornsoft)
2	(1)	Planetoids	(Acornsoft)
3	( )	Monsters	(Acornsoft)
4	(8)	Killer Gorilla	(Program Power)
5	( )	Chess	(Acornsoft)
6	(4)	747 Flight Simulation	(Microdeal)
7	(5)	White Knight MK II	(BBC)
8	(6)	Sphinx Adventure	(Acornsoft)
9	(2)	Hopper	(Acornsoft)
10	(7)	Disc Gross	(Computer Concepts)

★ All Model B

(Figures compiled by Micro Management Ipswich 0473 59181)

Spectrum★

1	(2)	Atic Atac	(Ultimate)
2	(6)	Lunar Jetman	(Ultimate)
3	(4)	3D Ant Attack	(Quicksilva)
4	(1)	Chequered Flag	(Psion)
5	( )	Jet Set Willy	(Software Projects)
6	(3)	Mouse Dive	(Durrell)
7	( )	Pogo	(Ocean)
8	( )	Boogaboo	(Quicksilva)
9	( )	Jet Pac	(Ultimate)‡
10	(7)	Flight Simulation	(Psion)

★48K only except where noted. ‡Both 16 and 48K.

(Figures compiled by W H Smith and Son, London)

Books

1	(2)	Interfacing Projects for the BBC Micro *Smith*	(Addison Wesley)
2	(3)	BBC Micro Disc Companion, *Latham*	(Prentice-Hall)
3	(7)	Advanced Programming Techniques on the *Commodore 64 Lawrence*	(Sunshine)
4	(1)	Mastering Machine Code on your *ZX Spectrum, Baker*	(Interface)
5	( )	Advanced Graphics with the BBC *Microcomputer, Angell and Jones*	(Macmillan)
6	(6)	*Commodore 64* Programmers Reference Guide *Commodore*	(Commodore)
7	( )	Computing for all the Family with the BBC Micro *Nabel*	(Sigma)
8	( )	Using the 64 *Garrard*	(Duckworth)
9	( )	Graphics on the BBC Microcomputer *Cryer*	(Prentice-Hall)
10	(8)	68000 Microprocessor Handbook, *Kane*	(Osborne)

(Figures compiled by Watford Technical Books, Watford 0923 23384 *Prestel* 28844)
(Last weeks position in brackets)

Book Ends

PROGRAM USE

Now that (assuming you are prepared to wait a couple of months for delivery) Microdrives are generally available for the Spectrum you can expect a series of books on the subject

Making the Most of Your Spectrum Micro Drives is basically a listings book rather than an explanatory book The basic techniques of using the drives and Interface 1 are explained but not in much greater depth than in the manual

The book does, however, contain a number of useful programs which both illustrate the workings and make excellent use of the system Programs include *Diarys* — an English/French translator, a slide show program which loads up a series of screens very quickly, and a filing system

Each of the programs is explained and a brief analysis of how each works is included But the real reason to buy this book is to get a number of programs you might actually have a real use for

Book	*Making the most of your Spectrum Micro Drives*
Price	*£5 95*
Micro	*Spectrum*
Supplier	*Micro Press Castle House 27 London Road Tunbridge Kent*

TURNING LOGO

What with *Horizon's* 'turning turtle' program and other signs of media infatuation, you'd have thought that there would be hundreds of books on Logo around In fact there are very few and one of these few — *Introducing Logo* — is by our own Boris Allan

The book attempts to explain just what is (and isn't) so wonderful about Logo at a fairly deep level and, in particular, discusses why it is commonly considered to be an educational tool

Boris Allan goes on to explain the differences between one implementation of Logo and another and includes some actual program examples showing the differences

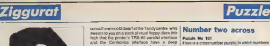
Book	*Introducing Logo*
Price	*£5 95*
Micro	*General*
Supplier	*Granada Publishing 8 Grafton Street London W1X 3LA*

This Week

Program	*Type*	*Micro*	*Price*	*Supplier*
Mower Man	Arc	Aquarius	£6.95	CCI
Adventures of Robin Hood	Arc	Atari	£9 99	English
Atari Graphics Wizard	Arc	Atari	£9.95	English
Carnival Massacre	Arc	Atari	£9.95	Thorn/EMI
Citadel Warrior	Arc	Atari	£9 95	English
Dan Strikes Back	Arc	Atari	£9.95	English
Neptune's Daughters	Arc	Atari	£9 95	English
123	Ed	BBC	£8 95	Compusoft
ABC	Ed	BBC	£8 95	Compusoft
3D Maser	S	Commodore 64	£4.95	Sosspan Soft
Black Hawk	Arc	Commodore 64	£7.95	Thorn EMI
Breaker	Arc	Commodore 64	£6.95	Sosspan Soft
City Attak	Arc	Commodore 64	£6.95	K Tel
Figaro 64	Ut	Commodore 64	£86 95	CMB
Gobbleman	Arc	Commodore 64	£4.95	Sosspan Soft
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Odyssey	Arc	Commodore 64	£8 95	K Tel
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Arcade Tape 1	Arc	Spectrum	£4 99	Sosspan Soft
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Family Fun Tape 3	S	Spectrum	£5.50	Sosspan Soft
Frog Shooter	Arc	Spectrum	£6 99	Kuma
Games Pack No 1	Arc	Spectrum	£5.00	CCI
Games Pack No 2	Arc	Spectrum	£5 00	CCI
Games Pack No 3	Arc	Spectrum	£5.00	CCI
Games Pack No 4	Arc	Spectrum	£5.00	CCI
Games of Chance Tape	S	Spectrum	£4.95	Sosspan Soft
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Mission Omega	Arc	Spectrum	£2.09	Warlock
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Tower of Evil	Arc	Spectrum	£6.95	Thorn/EMI
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Vegetable Crash	Arc	Spectrum	£6.95	Kuma
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Bob's Blunder	Arc	Vic 20	£2 99	Warlock
Computer War	Arc	Vic 20	£5 95	Thorn/EMI
Snowstorm	Arc	Vic 20	£2 99	Warlock
Submarine Commander	Arc	Vic 20	£9 95	Thorn EMI
Tank Commander	Arc	Vic 20	£5.99	Thorn/EMI
Tower of Evil	Arc	Vic 20	£8 99	Thorn/EMI

Key Ad — adventure/**Arc** — arcade/**Ed** — education/
S — strategy simulation/**Ut** — utility

This Week is a new section that covers all the new software coming on to the home micro market each week All suppliers should send details of their new programs to This Week Popular Computing Weekly 12-13 Little Newport Street London WC2R 3LD





Ultimate goal

It is a new sort of adventure game — in real time yet — and after many months I'm still a hopeless addict questing for the glorious ultimate goal. At the start of *Interface Adventure* you find yourself not in the conventional cavern or dungeon but in a dusty office littered with books and typewriters. Instead of the usual source of light there is a Commodore 64.

Your mission, should you choose to accept it, is to print out your sense-shattering programs and deathless prose in suitable format for computer magazines, thus assuring you of fame and riches if only the editors display a reasonable gullibility. Unfortunately the powers of Evil have set barriers in your way and their foul emissaries Creditcardlimit and Bankmanager bar the primrose path to the computer hardware shop. What a challenge!

After an exciting period of searching through the office's 2,304 locations, all filled with junk and old computer magazines, you are lucky enough to discover a magic talisman to aid you. It is a battered TRS-80 Line Printer VII left over from days of yore when the world was young, pigs flew everywhere, and a Tandy Model I wasn't a bad machine to own. It is the work of a moment to think "Aha RS-232!" and command the goblin hordes of Commodore to supply the relevant interface.

The game then hangs up for two months solid, a cleverly realistic touch. Eventually you find yourself in a low tavern being told at length about the heresies of the dread RS-232 cult, of nameless abominations and loathsome, obscene rites like the Sussing Out Of Parity and the Preparation Of The Special Cable, all so fearful and eldritch that hastily you instruct the Commodore goblins not to bother.

Instead, led on by a hint from that tavern, you consult a wise old dwarf at the Tandy centre who swears to you on a stack of ritual floppy discs *this* high that the printer's TRS-80 parallel interface and the Centronics interface have a deep spiritual oneness. It is the work of mere hours to take a high-speed InterCity dragon to the faery land of Tottenhamcourtroad, where legends say the streets are paved with Centronics interfaces. In fact they are paved with paving stones, and you wear out several shoes before wresting the fabled interface from its fearsome Guardians, who inflict severe flesh wounds in the region of your wallet.

Back in the office labyrinth, you triumphantly link up your system and list several programs. You solve the intricate riddle of how to make your Centronics driver routine work with the Forth cartridge picked up on your wanderings, and pridefully use bit-mapped graphics to construct the sacred £ sign the printer lacks. There are a few difficulties, like a tendency to omit the first character of every twentieth line or so, and once in a while to sttuttter slightly, but you feel a sense of achievement. Why then is your score so strangely low? Only when you try your Easy Script word processor do you realize that the adventure has hardly begun.

In fear and trembling you load *Easy Script*. You select Centronics output. You type "Testing" and dump this cosmic message to the printer. It prints "TTTTeeeesssstttiiiinnnngggg". Let a draw a merciful veil over the next few hours, noting only that the magic words you pronounce do nothing but blister the keyboard and cause birds to fall lifeless from the air.

Again you venture into the intricacies of this fantasy world. The High Priestess of Commodore Software (despite her cult's reputation for obduracy in lands far across the sea) is kind, offering runic diagrams of user ports and other things best not named; she opines that the printer or the interface must be to blame. The Tandy gnomes suggest that the computer or the interface must be to blame. Aztec Software, awesome makers of the interface, are mysteriously silent.

The adventure now takes a serendipitous turn, when despite your three missives cancelling the order and asking for your gold pieces back, the mighty Amulet of RS-232 arrives from Commodore. Filled with hope, you bodge up some connections which seem cabalistically OK, and write words of power into the CBM 64 command and control registers. The printer speaks! It speaks in tongues. It looks like Serbo-Croat.

Interface Adventure. You really must try it, it's so addictive. The game of a lifetime.

David Langford

Number two across

Puzzle No 101

Here is a crossnumber puzzle, in which numbers rather than words have to be fitted into the grid.

1.			2.
	■	■	
	■	3.	
4.		■	

Clues *Across* — (1) $A*B$ (3) B (4) A *Down* — (1) B^2 (2) A^2

Given these clues, what are the values of A and B?

Solution to Puzzle No 96

The first step is to determine the number of handshakes when N persons are present.

If there are N delegates present, each person would shake hands $N-1$ times and thus there would be $N*(N-1)$ individual handshakes. But since each event is shared by two persons this total must be divided by 2 to arrive at the number of actual handshakes: $(N*(N-1))/2$.

```
10 LET N = 100 20 LET H = N*(N-1)/2 30 LET T =
H*2 40 LET G = N+1 50 LET Q = G*(G-1)/2 60 IF Q =
T THEN PRINT N;" ";H;G;" ";Q 70 IF Q > T THEN
GOTO 100 80 G = G+1 90 GOTO 50 100 N = N+
1 110 GOTO 20
```

The program determines the number of handshakes when 100 or more persons are present. This total is doubled and the result is tested to determine if it too is in the series of numbers that could be formed by shaking hands in the manner described.

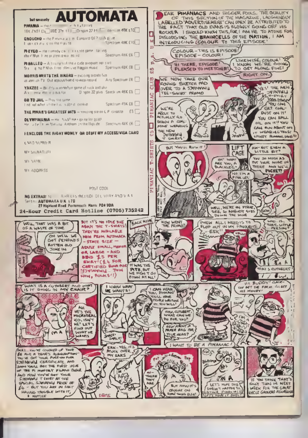
Of all possible results only one is in the range stated in the question.

The attendances for the two years were 493 and 687 delegates — resulting in 121,278 and 242,556 handshakes, respectively.

Winner of Puzzle No 96

The winner is Jim Cowie, Seafield Terrace, Portsoy, Banff, who receives £10.

The Hackers



but seriously AUTOMATA
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Spectrum 48K £10
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24-Hour Credit Card Hotline (0705) 735242
PIMANIAC T-SHIRTS £5 PIMANIAC CLUB £5 p.a. U.K.
DEAR PIMANIACS AND BIGGER FOOLS, THE QUALITY OF THIS SECTION OF THE MAGAZINE, LAUGHINGLY LABELLED 'ADVERTISEMENT' CAN ONLY BE ATTRIBUTED TO THE FACT THAT OLD EVANS IS SLOWLY GOING ORF HIS ROCKER. I SHOULD KNOW THIS, FOR I AM HE. TO ATONE FOR DISLODGING THE BRAINCELLS OF THE NATION, I AM INTRODUCING COLOUR TO THIS EPISODE'
COLOUR - THIS IS EPISODE! EPISODE - COLOUR!
HI THERE, EPISODE! PLEASED TO MEETCHER!
LIKEWISE, COLOUR! I KNOW WE'RE GOING TO GET ALONG FINE!
RIGHT ON..
WE NOW TAKE OUR ROVING SKETCH PAD OVER TO A TEE-SHIRT PROMO
WE'RE ABOUT TO ACTUALLY GO DOWN A COAL MINE WEARING THE NEW T SHIRTS!
YES! THE NEW T-SHIRT
YOU CAN GET COAL-DUST ON IT! YOU CAN SPILL OIL ON IT!! YOU CAN RUN ABOUT ON IT WEARING THOSE SPIKEY RUNNING SHOES!!!
BUT YOU'LL RUIN IT!
LIFT CAGE
OY! WHAT ARE YOU, A BLACKLEG?
NO I'M A PINK LEG!
AW- NOT EVEN A LITTLE BIT?
YOU SO MUCH AS PUT YOUR NOSE IN THERE AND WE'LL PICKET!
WELL, WE'RE ON STRIKE, SEE, SO NOBODY GOES DOWN THE MINE
WELL, THAT WAS A BIT OF A WASTE OF TIME
OH WELL WE GOT PENFOLD'S ROTTEN OLD JOKE IN
BUT IT'S NO IDLE JIVE ABOUT THE T-SHIRTS! THEY'RE AVAILABLE NOW FROM AUTOMATA - STATE SIZE - ADULT SMALL, MEDIUM OR LARGE - AND SEND £5 PER SHIRT! (£4 FOR CERTIFIED BONA FIDE JOIN NOW, FOLKS!!)
BACK HOME
HOW WENT THE PROMO?
IT WAS THE PITS, BUT WE DIDN'T GO DOWN AT ALL!
PHEW ALL I NEED IS TO FLOP OUT IN MY FAVOURITE -- EEK!!
HALLO
WHO... IS... THAT... LITTLE PERSON?
THAT'S CUTHBERT!
WHAT IS A CUTHBERT AND WHAT IS IT DOING IN MY CHAIR?
AH HE'S THE MICRODEAL KID, ISN'T HE? LET'S FIND OUT WHAT HE WANTS
I'M A
I KNOW WHAT HE WANTS!
SMACK! SMACK!
I CAN HEAR YOU, PIMAN! YOU'LL HAVE PEOPLE WRITING IN YOU WILL!
NOW, CUTHBERT, WHAT CAN WE DO FOR YOU?
HOW ABOUT A PAPER BAG FOR YOUR HEAD?
HI BUDDY! GAIR- YOU GET THE FORM I'LL GET HIS MONEY!
I'M A
I WANT TO BE A PIMANIAC!
OKAY. YOU'VE COUGHED UP YOUR £5 FOR A YEAR'S SUBSCRIPTION YOU'VE GOT YOUR PUCE-ON-PINK CERTIFICATE AND SOON YOU'LL GET THE FIRST ISSUE OF THE PI MONTHLY PILAND BUGLE AND NOW YOU'VE GOT YOUR T SHIRT AT THE SPECIAL PRICE OF £4 - BUT YOU ARE IN FACT HAVING TROUBLE WITH IT, I NOTICE
ERK - YES IT'S STUCK OVER MY EARS
EVANS
POP POP
NO - THERE THEY ARE
BUT NOW IT'S CAUGHT ON SOMETHING ELSE!
I'M A
LET'S HOPE THIS DOESN'T HAPPEN TO OTHER PIMANIACS!
LET'S HOPE IT DOES!
IF YOU THINK THAT'S SILLY TUNE IN NEXT WEEK FOR THE GREAT UNCLE GROUCHO RESURGENCE